

**Former Clifton Caravan Sales  
Morpeth, Northumberland**

**Phase 2 Geoenvironmental Appraisal**

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A

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## Executive Summary

<b>Ground Conditions</b>	<p>Made ground present across the site comprising colliery spoil up to 4.2m thick in the north west.</p> <p>Glacial clay and sand present underlying the made ground with bedrock recorded at depths of 2.25m to 8.75m.</p> <p>An intact coal seam was recorded in RH04 at 8.5m bgl and broken ground recorded at 25.9m bgl in RH06. No shallow coal workings identified.</p>
<b>Groundwater</b>	<p>Perched groundwater recorded in both the trial pits and window sample boreholes at various levels within the colliery spoil and natural sands.</p>
<b>Ground Gas</b>	<p>CIRIA C665 Characteristic Situation 2 gas regime (subject to completion of gas monitoring). Note that NCC generally require CS2 gas protection measures as a minimum.</p>
<b>Contamination and Remediation</b>	<p>PAH contamination identified within made ground. Colliery spoil contains potentially combustible soils and is texturally unsuitable in plot gardens to support healthy plant growth.</p> <p>Provision minimum 600mm clean cover to gardens and 400mm for landscape areas.</p> <p>Removal of combustible soils from service corridors and from beneath structure footprints and placed beneath hardstanding and/or landscaped areas &gt;1m bgl.</p>
<b>Mining</b>	<p>No shallow mine workings identified within influencing distance of surface. Therefore, no remedial treatment is required. Mine entries (2 adits and 1 mineshaft) are present within the site which will require exposing to confirm location and to allow treatment where appropriate.</p>
<b>Foundations</b>	<p>Subject to site levels, a mix of foundation types will be required comprising conventional strip, trench fill and vibro/ piles terminating in the minimum firm to very stiff glacial clay, medium dense sand or shallow bedrock based on an allowable bearing capacity of 100kPa. A minimum depth of 750mm in cohesive soils, deepened as necessary in the vicinity of new or proposed planting.</p> <p>Suspended floor slabs will be required for the majority of plots where made ground is &gt;600mm thick.</p>
<b>Tree Influence</b>	<p>Volume change potential of clay soils is 'Low'. Trees are present in several areas, hence foundation depths will require deepening where appropriate.</p>
<b>Concrete Classification</b>	<p>Buried concrete should be designed to BRE Special Digest 1:2005 Design Sulphate Class DS-4 with an ACEC site classification AC-3.</p>
<b>Soakaway Drainage</b>	<p>The site is not considered suitable for soakaways due to the depth of made ground and presence of glacial clay in many parts of the site.</p>
<b>Waste Classification</b>	<p>Made ground is extensive and likely to be non-hazardous or hazardous due to the high TOC content, subject to confirmation by the receiving landfill and any necessary WAC testing.</p>
<b>Roads</b>	<p>Indicative CBRs for the colliery spoil are 2%, natural clays 3% and natural sands 10%. This will require verification at formation level.</p>
<b>Preliminary Abnormal Development Constraints</b>	<ul style="list-style-type: none"> <li>• Former building floor slabs and foundations will require breaking out and removal.</li> <li>• Mine entries require locating and treatment.</li> <li>• Excavations unlikely to remain stable and will require support.</li> <li>• Gas protection measures will be required.</li> <li>• Suspected former culvert will require locating and removal and existing sinks will require inspection and tracing.</li> <li>• Development to maintain safe distance from slope crest at northern boundary.</li> <li>• Importation of topsoil required.</li> </ul>

The above summary should not be used in isolation and reference should be made the full report which provides a detailed assessment of the risks affecting the development.



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## 1. Introduction

### 1.1 Commission

Coast Consulting Engineers Ltd (Coast) was commissioned by Northumbria Homes Ltd (NHL) to produce a Phase 2 Ground Investigation for a proposed residential development at Clifton near Morpeth, Northumberland. A site location plan is presented as Drawing No. 20004-01 in Appendix A.

### 1.2 Proposals

It is understood that (NHL) propose to construct residential housing with gardens and associated infrastructure at the site. A proposed development layout is presented as IDP (Scotland) Drawing No. 1185 – L001 B in Appendix A.

### 1.3 Objectives

The objectives of the investigation were as follows:

- Review existing data and reports pertaining to the site.
- Provide information on ground conditions including underground mine workings.
- Provide recommendations for foundation solutions.
- Assessment of potential risks from contamination.
- To assess the risk posed by hazardous ground gas.
- Provide recommendations for development.

This report presents the factual information available during this appraisal, interpretation of the data obtained and recommendations with respect to future development. It has been assumed in the production of this report that the site is to be redeveloped for an end use comprising residential with home grown produce.

### 1.4 Information Sources

This Phase 2 Site Appraisal is based on the findings of the investigation, chemical analysis and geotechnical testing undertaken during the course of the assessment. The results have been used to refine the conceptual model and initial recommendations outlined in the Coast desk study report:

- 'Former Clifton Caravan Sales, Morpeth, Northumberland - Phase 1 Geoenvironmental Appraisal and Coal mining Risk Assessment', Ref. 20004 dated February 2021.

### 1.5 Limitations

This report has been prepared for NHL and their appointed agents only and should not be relied upon by any third party without the written permission of Coast. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the



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authors do not owe them any Duty of Care or Skill. This report is based on and limited to an assessment of the information provided in Section 1.3.

## 2. Phase 1 Desk Study Summary

The following is a summary of the findings of the Phase 1 Desk Study and should not be read in isolation. For full details reference should be made to the report outlined in Section 1.4. In summary, the Phase 1 Site Appraisal highlighted the following:

Site Description	A 2.9ha plot of land off the A197, Clifton, Morpeth. The site is currently occupied by a former caravan, sales, storage and maintenance yard with gravel and asphalt surfacing and landscaping. Trees surround the site at most boundaries.
Site History	The site was farmland until development of West Clifton Colliery in the 1930s until the late 1940s. Recent occupation of the site has comprised caravan storage, maintenance and sales. A tributary of the Coal Burn which flows through the site from west to east is in culvert across much of the site.
Anticipated Geology	Made ground associated with past activities up to 2.3m thick. Superficial deposits are indicated to comprise predominantly glacial clay with discontinuous bands of sand which are anticipated to be <5m thick. Bedrock comprises mudstone, siltstone or coal of the Pennine Lower Coal Measures, with the Three Quarter, Brockwell and Victoria coal seams all likely to underlie the site at variable depths.
Mining & Natural Cavities	A potential risk of the site being affected by shallow coal mine workings within the Brockwell and Victoria coal seams. Further investigation is required. The location of two adits needs to be confirmed to assist with proposed layouts.
Contamination	The risk of significant contamination on site is considered to be low based on the results of previous investigations and nature of past historical activities.
Environmental Considerations	Superficial Geology: Secondary Undifferentiated Aquifer. Solid Geology: Secondary A Aquifer. Tributary of Coal Burn in culvert beneath the site.
Ground Gas	The risk of the site being affected by ground gas is considered to be low to moderate. No radon protection measures are required.
Flooding	The east of the site is indicated to lie within an area at risk from surface water flooding. The site does not lie within a Flood Zone 2 or 3.
Slope Stability	No significant slopes are anticipated at the site.
Infiltration Drainage Potential	Soakaways are considered unsuitable for this site at this stage due to the presence of made ground, mine entries and low permeability drift soils.
Preliminary Foundation Assumptions	Traditional spread or trench fill foundations should generally be suitable for low rise housing, subject to the results of the ground investigation, proposed structural loads, depths of made ground and any requirements for stabilisation of shallow mine workings. Ground bearing floor slabs may be feasible subject to made ground being less than 600mm thick otherwise suspended floor will be required.
Preliminary Abnormal Development Constraints	Potential shallow coal mining below site. Three mine entries within the site will need to be located and treated or provided with no build zones. Made ground soils are anticipated to provide a design CBR of <2% subject to confirmatory testing and are anticipated to require maximum capping thickness. Made ground may be unsuitable for re-engineering/ re-use – costly to dispose off-site. Subject to development levels, earthworks testing and reporting may be required.

A plan showing the main features of note is included as Drawing No. 20004-02 in Appendix A.



### 3. Fieldwork and Laboratory Analysis

Based on the findings of the Phase 1 Appraisal, the following scope of fieldwork and laboratory analysis was undertaken within areas accessible at the time of investigations:

- Machine excavated trial pits (10 No.) using a 360 tracked excavator to depths of up to 4.50m bgl to allow logging of soils, obtain samples for laboratory analysis and to undertake in situ tests.
- Drilling of 10 No. window sample boreholes (WS01-WS10) to depths of up to 5.45m bgl, to assess ground conditions, allow in situ testing, obtain samples for laboratory analysis.
- Drilling of 6 No. rotary open hole boreholes to 45m depth to establish if shallow coal workings underlie the site.
- Installation of 5 No. gas monitoring standpipes.
- Geotechnical testing of soils, including water soluble sulphate, soil pH and Atterberg Limits.
- Contamination testing of Made Ground soils to comprise standard suites of metals, metalloids, non-metals, Polyaromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), asbestos and calorific value.

The fieldwork was undertaken between the 16<sup>th</sup> and 30<sup>th</sup> March 2021.

A plan showing the location of the exploratory holes is included as Drawing No. 20004-03 in Appendix A and copies of the exploratory hole logs are provided in Appendix B.

Geotechnical testing was performed at a UKAS accredited laboratory and in accordance with the procedures defined by BS1377:1990 "Methods of Test for Soils for Civil Engineering Purposes". Similarly, chemical analysis of soils was performed at an MCERTS and UKAS accredited laboratory. Copies of the laboratory geotechnical and chemical test results are included in Appendix C and D respectively.

#### 3.1 Investigation Rationale

Based on the findings of the desk study and the preliminary Conceptual Site Model, the location of the exploratory holes was based on the following rationale:

Exploratory Hole	Rationale
TP01 – TP08 & WS01 – WS10	General site coverage
TT01 and TT02	Location of former mine adit entries
RH01 – RH06	General site coverage



## 4. Ground Conditions

### 4.1 Soil Descriptions

Depth Range to base of Strata	Material Type
Min - Max Depth 0.03m – 0.3m	Surface cover & Sub-base: Asphalt or gravel overlying gravel of limestone or burnt shale. Present in TP04 - TP08, WS03-WS07, WS09 & WS10.
Min - Max Depth 0.55m – 4.2m	Made Ground (Colliery Spoil): Predominantly silty SAND AND GRAVEL with cobbles and boulders of sandstone, siltstone and mudstone with brick, concrete, timber and metal and occasional pockets of coal fines and burnt shale. Recorded in most locations.
1.4m	Made ground TP02 only. Soft white clay.
Min - Max Depth 1.1m – 3.0m	Relict Subsoil: Greenish grey mottled black SAND with variable silt and gravel content. Proven in TP01, TP05, TP06 and WS01-WS03.
Min - Max Depth 1.4m – >5.45m	Glacial Sand: Brown and grey, locally orange medium to coarse SAND with variable silt, gravel and cobble content.
Min -Max Depth 1.5m – 8.75m	Glacial Till: Soft to stiff (typically firm) CLAY with variable sand, gravel and cobble content.
Min – Max Depth to Rockhead 2.25m – 8.75m	Bedrock: Mudstone sandstone and siltstone bedrock recorded beneath the glacial till or glacial sand.

### 4.2 Soil Properties

#### 4.2.1 Made Ground (Colliery Spoil)

Standard Penetration tests (SPTs) performed within these soils were corrected to  $N_{60}$  values based on the energy ratio of the test equipment. Values between 8 and 18 with typical values of 10 being noted confirming loose to medium dense soils.

Water soluble sulphate and soil pH tests on thirteen samples of these soils ranged from 45mg/l to 1,721mg/l with pH of 3.7 to 7.6. A test on the white clay material in TP02 recorded 53mg/l with pH of 12.5.

Calorific value tests on ten samples of these soils ranged from 0.9MJ/kg to 22.2MJ/kg.

#### 4.2.2 Glacial Sand

Standard Penetration tests (SPTs) performed within these soils were corrected to  $N_{60}$  values based on the energy ratio of the test equipment. Values between 8 and 30 with typical values of 12 being noted confirming predominantly medium dense soils.

Water soluble sulphate and soil pH tests on four samples of these soils ranged from 29mg/l to 316mg/l with pH of 6.9 to 7.8.



### 4.2.3 Glacial Till

Hand shear vane results in cohesive glacial till ranged between 50kPa and 95kPa, indicative of medium to high strength.

Plasticity results confirm that the glacial till ranges between a clay of low to intermediate plasticity. Calculation of the modified plasticity index in accordance with NHBC Chapter 4.2 indicates that the clay has a low volume change potential.

Water soluble sulphate and soil pH tests on four samples of these soils ranged from 70mg/l to 322mg/l with pH of 6.9 to 7.6.

SPT N values were corrected to  $N_{60}$  values based on the energy ratio of the testing equipment, recording values in the range between 11 and 25. Correlation with laboratory plasticity indices indicates a mass shear strength of approximately 55 to 125kPa, generally similar in strength range to the hand shear vane results.

### 4.2.4 Rock

A water soluble sulphate and soil pH test on a sample of rock confirmed 47mg/l with pH of 7.0.

## 4.3 Mining

Exploratory Hole	Bedrock Depth (m bgl)	Depth to Coal Seam / Workings (Thickness (m))	Rock Cover Above Solid Coal Seam (rock cover ratio*)	Notes
RH01	8.75m	17.8m (0.5m)	9.05m (16.1: 1)	Carbonaceous Mudstone
RH02	4.90m	13.4m (0.6m)	8.5m (14.1: 1)	Carbonaceous Mudstone
RH03	2.4m	17.2m (1.4m)	14.8m (10.5: 1)	Carbonaceous Mudstone
RH04	2.6m	8.5m (0.7m)	5.9m (8.4: 1)	Intact Coal (Three Quarter Coal?)
RH05		-	-	-
RH06	2.3m	25.9m (0.8m)	23.6m (29.5: 1)	Broken Ground/ Bed separation (Brockwell Coal (Thickness 0.6m))

\*the ratio between the thickness of bedrock above the seam and the seam thickness

No evidence of shallow mining was recorded during the investigation with the exception of broken ground recorded in RH06 at a depth of 25.9m bgl. This information ties in with similar data recorded in a BGS borehole (NZ28SW52) which recorded 'waste old Brockwell workings' at approximately 23m bgl.

Investigations to locate the two mine entries were undertaken using a 360° tracked excavator. TT01 located in the north west of the site was placed to target mine entry (CA Ref) 419583-005 and TT02 was placed in the east to target mine entry (CA Ref) 420583-002.



During excavation of TT01, a predominance of bricks within the colliery spoil was encountered in the east of the excavation in the approximate location indicated by the Coal Authority for the adit. In addition, a partial broken concrete structure with a vertical edge on the east face and inclined edge on the western face was proven at a depth of 2.0m bgl. Full exposure of this feature could not be completed due to the unstable nature of the colliery spoil. At the northern boundary of the site, it was noted that a stream (Coal Burn) which emanates from a culvert below the A1 highway in the west enters a sink to the immediate north of the location of the former adit. It is unclear whether this stream then enters a culvert which crosses through the site or potentially enters the adit itself.

Excavation of TT02 was restricted by the existing access road into the site to the west and an earthen embankment to the east. However, no evidence of buried structures or remnants of former structures which might suggest the presence of the adit was encountered. Rock was encountered at a depth of 3.25m bgl.

A geological cross-section is provided as Drawing No. 20004-03 in Appendix A.

#### 4.4 Groundwater Observations

Exploratory Hole	Depth (m)	Description	Stratum
TP01	2.0	Heavy inflow of perched groundwater	Colliery Spoil
TP03	3.5	Slow ingress of perched groundwater	Colliery Spoil
TP04	1.0	Slight seepage of perched groundwater	Colliery Spoil
	1.6	Moderate seepage from field drain	Field drain
TP06	1.35	Moist soils recorded	Glacial Sand
TP07	0.9	Heavy inflow of perched water from old drain	Old drain
TT01	4.2	Slight seepages of perched water	Colliery Spoil
TT02	1.7	Slight seepages of perched water	Colliery Spoil
WS04	3.0	Wet soils recorded	Glacial Sand
WS06	1.5	Damp soils recorded	Glacial Sand

#### 4.5 Contamination – Visual and Olfactory

Colliery spoil comprising sand, gravel and cobble sized particles within a clay silt matrix and was prolific across the site but noted to be deeper in the north west (c.4.2m thick) and shallowest in the south and south (c.<1.0m thick). Occasional bands and pockets of coal fines were also noted in several locations within the colliery spoil.

Olfactory evidence of possible hydrocarbon contamination with a moderate odour was noted in TT01 in the east of the excavation below 2.5m bgl. A sample of this material was obtained and tested at the laboratory for speciated hydrocarbons and is discussed in section 6.

#### 4.6 Obstructions

Following a review of historical mapping, trial pit TP02 and TP04 was positioned to confirm the presence of former structures at the site. Concrete floor slabs including former brick



walls and historic services was proven within 2.0m of the present ground surface. In addition, an apparent localised area of deep soft ground in which large rough hewn timber sleepers was observed to the east of TP02 connected to the concrete slabs of the former structures. It is suspected that these features relate to the former large structure indicated on 1960s OS maps.

Evidence of shallow foundations and redundant buried services associated with a former house in the south east corner of the site was recorded at 0.4m thick at a depth of 0.7m bgl in TP07.

A former culvert is suspected to be present crossing through the site from west to east. However, the exposed section of this stream located centrally did not show signs of flowing water despite the moderate and continuous flow of water noted emanating from the culvert beneath the A1 highway at the western boundary of the site. It is suspected that this feature may have been diverted around the northern perimeter of the site following site remodelling works during the 1960/70s. As mentioned in section 4.3, it is unclear as to where the stream now discharges (newer culvert or potentially the adit mine entry).

#### 4.7 Infiltration Testing

Infiltration testing was beyond the scope of this investigation. However, given the prevailing ground conditions which include a high proportion of clay sized particles in both the made ground and natural soils and the potential for destabilising proposed foundations in areas with granular soils, it is considered that the site will be unsuitable for infiltration drainage systems.



## 5. Preliminary Ground Gas Assessment

Note that the monitoring assessment provided below is preliminary and subject to change until completion of the monitoring programme.

As gas and groundwater monitoring is presently ongoing the full results and recommendations will be presented in an addendum report following the final visit. Copies of the results from the monitoring visits to date are included in Appendix E.

Five gas and groundwater monitoring wells were installed during the investigation. Response zones were placed generally between 1.0m and 3.0m bgl within WS02, WS05-WS07 and WS09 within the Made Ground and natural soils. WS02 was positioned to determine the presence of mine gas issuing from the mine shaft and WS09 was positioned to account for potential mine gas issuing from the eastern most adit.

A provisional summary and assessment of the monitoring information obtained to date is presented below.

Location	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow (l/hr)	Barometric Pressure (mb)	Maximum GSV*	
						CH <sub>4</sub>	CO <sub>2</sub>
WS02	0	4.2	12.4	<0.1	1013	<0.07	<0.07
WS05	0	1.4	19.5	<0.1	1013		
WS06	0	3.4	16.3	<0.1	1013		
WS07	0	6.7	17.6	<0.1	1013		
WS09	0	0.6	19.2	<0.1	1013		

\* GSV: CIRIA C665 Gas Screening Value, based on maximum flow and concentration

### 5.1 Provisional Assessment of Gas Protection Measures

Assessment of ground gas monitoring results has been carried out in accordance with CIRIA C665 and BS8485 (2019). Although the calculated GSV is very low, the presence of carbon dioxide above 5% requires an increase in the Characteristic Situation (CS) to CS2 in accordance with BS8485. This is a low hazard potential which will require gas protection measures.

In accordance with Table 4 of BS8485, a residential end use equates to a Type A Building. For CS2 gas conditions a point score of 3.5 must be achieved for adequate gas protection, which can be achieved from a range of measures as described in Section 7 of the Standard.

It should be noted that Northumberland County Council currently demand that all new development within Coal Authority standing advice areas upon coal field areas are provided with gas protection measures to at least Characteristic Situation 2 (CS2) levels in accordance with CIRIA C665 and BS8485, unless greater precautions are dictated by assessment.



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## 6. Contamination Assessment

### 6.1 Human Health Risk Assessment

The assessment involves the screening of the measured concentrations of contaminants of concern obtained during the investigations against published generic assessment criteria (GAC) values which are representative of a 'minimal' or 'tolerable' risk to human health. The assessment criteria adopted are the LQM/CIEH Suitable for Use Levels (S4ULs) for Human Health Risk Assessment (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3279; All rights reserved). Where no S4UL is available, reference is made to other relevant standards as appropriate.

Based on the proposed end use, GACs for a residential end use with home grown produce have been adopted. The soil organic matter content was calculated to be 6%, based on the average TOC concentration. A summary assessment table of all chemical results and GACs is provided in Appendix F.

#### 6.1.1 Heavy Metals & Non-Metals

Twelve made ground soil samples were analysed. None of the samples analysed exceeded the relevant GAC value.

Two samples of coal fines taken from TP05 (2.5m) and TP04 (0.9m) confirmed calorific value contents of 19.6-22.3MJ/kg respectively, which exceeds 10MJ/kg for potential combustibility outlined in ICRCCL Guidance Note 61/84 2<sup>nd</sup> Ed 'Notes on the fire hazards of contaminated land'.

Eleven samples of made ground were analysed for total sulphur. Results ranged from 329mg/kg to 6,934mg/kg.

#### 6.1.2 Total Petroleum Hydrocarbons (TPH)

Two samples of made ground (one from TT01) and one from WS07) were tested for speciated TPH. Neither sample exceeded the relevant GAC for the proposed end-use. However, notable exceedance of the laboratory limits of detection was recorded in the sample from TT01 in which olfactory hydrocarbon odours was detected.

#### 6.1.3 Polycyclic Aromatic Hydrocarbons (PAH)

Twelve made ground soil samples were tested for speciated PAH. Benzo(a)pyrene and Benzo(b)fluoranthene were recorded to exceed the relevant GAC in 2 samples (TP04 & TP05), with Dibenzo(a,h)anthracene exceeding the relevant GAC in 3 samples (TP02, TP04 & TP05), all located within the upper 600mm of soil.

#### 6.1.4 Calorific Value

ICRCCL Guidance Note 61/84 2<sup>nd</sup> Ed 'Notes on the fire hazards of contaminated land' suggests that soils with a calorific value above 10MJ/kg are almost certainly combustible while those <2MJ/kg are unlikely to be combustible.



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Twelve samples of the colliery spoil were tested for calorific value. Results ranged from 0.97MJ/kg to 22.2MJ/kg.

Two samples of coal fines taken from TP05 (2.5m) and WS04 (0.9m) confirmed calorific value contents of 19.6-22.3MJ/kg respectively, which is typical of coal material. Elsewhere, samples of colliery spoil recorded results in the range 0.97-6.4MJ/kg with an average of 3.4MJ/kg. Based on the results it seems unlikely that the majority of colliery spoil presents a combustion risk although isolated pockets of coal are likely to be combustible.

#### 6.1.5 Asbestos Containing Materials (ACMs)

All twelve soil samples tested were screened for the presence of asbestos. None tested positive for asbestos presence.

#### 6.2 Controlled Waters Risk Assessment

Due to the absence of significant contamination and the predominance of soils with a low permeability, no controlled waters are deemed to be at risk. Therefore, no leachate or groundwater testing has been carried out.



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## 7. Updated Conceptual Site Model

Following the results of the ground investigation, the preliminary CSM established in the Phase 1 geo-environmental appraisal has been revised to reflect the additional information now available.

### 7.1 General

Risk to human health or environmental receptors is based on an assessment of one or more source-pathway-receptor linkages. The 'source' is any substance which has the potential to cause significant harm to a relevant receptor and the 'pathway' is any route by which contamination may travel to impact on a 'receptor'.

The Conceptual Site Model (CSM) summarises the principal contaminant sources, pathways and receptors for this site and the likelihood of the existence of a pollutant linkage. The assessment is based on a presumed end use of a residential development with homegrown produce.

### 7.2 Identified Pollutants of Concern

The ground investigation has confirmed the presence of the following contaminants of concern in relation to human health and controlled waters within the shallow made ground soils:

- Polyaromatic Hydrocarbons (benzo(a)pyrene, Benzo(b)fluoranthene & Dibenzo(a,h)anthracene).

The ground investigation has confirmed the presence of the following contaminants of concern in relation to the built environment within the shallow made ground soils:

- Water soluble sulphate, PAHs and potentially combustible soils.

### 7.3 Environmental Risk Assessment

The significance of the potential source-pathway-receptor linkages identified in the CSM can be assessed using the following criteria:

- Low risk – not likely to cause significant harm to human health or controlled waters. Remedial measures are not likely to be required;
- Moderate risk – it is possible that significant harm to human health or controlled waters could occur depending on site specific circumstances. Remedial measures may be required to mitigate potential risks;
- High risk – it is likely that significant harm to human health or controlled waters will occur unless appropriate remedial measures are incorporated into the development.

The potential pollutant linkages pertaining to the site and the assessed significance are summarised in the CSM table below.



Source	Pathway	Receptor	Pollutant Linkage: Assessed Risk
<b>Human Health</b>			
PAH contamination within made ground	Direct contact and ingestion/inhalation of contaminated soil and dust	Construction workers	Low: Mitigated by use of appropriate PPE and good site practice
	Direct contact and ingestion/inhalation of contaminated soil and dust. Ingestion of home grown vegetables	End users	Low to moderate: Investigations have proven concentrations of contaminants above the GAC for the proposed end-use. Mitigation measures will be required as part of the development to prevent end users coming into contact with made ground
Ground gas associated with made ground deposits, coal mining or volatile vapour	Vertical and lateral migration into confined spaces. Inhalation	End users	Low*: Preliminary gas monitoring has confirmed slightly elevated carbon dioxide. Gas protection measures will be required.
<b>Controlled Waters</b>			
Contaminants within the made ground (PAH & hydrocarbons (TT01))	Vertical and lateral migration	Secondary Aquifers (Superficial & Bedrock).  Coal Burn	Low: Site underlain by soils with a high clay content (low permeability) which will restrict lateral and vertical migration.
<b>Built Environment</b>			
Water Soluble sulphate and PAH contamination within made ground. Potentially combustible soils	Direct contact with contaminated soil and water	Buried Concrete Water Supply Pipes	Low to moderate: Mitigated by sulphate resistant concrete and robust water supply pipework and removal of pockets of combustible soils.

\*CIRIA C665 & BS8485.



## 8. Remediation Statement

### 8.1 Contamination

The generic risk assessment confirmed that PAHs are contaminants of concern which may potentially pose a risk to human health for the proposed residential end-use. In addition, potentially combustible soils are present in pockets within the colliery spoil which may pose a risk to future end-users and the built environment. In order to break the potential pollutant linkage, remedial measures are required.

### 8.2 Remediation

As the made ground is deep in nature and in the interests of sustainability, it is not considered feasible or practical to remove the contaminated soils from site. In addition, the made ground is not considered texturally suitable to remain at shallow depth within proposed gardens.

Pockets or lenses of potentially combustible soils (high coal fines content such as those encountered in WS04 and TP05) have been identified. Such soils present a potential risk to development through underground fires and also present an additional ground gas risk. Such soils should be removed to a depth of 1.0m of surface beneath plot footprints or within landscaping areas.

#### 8.2.1 Gardens and Landscaping

Consequently, the most pragmatic approach will be for all garden and landscaping areas to be provided with an appropriately designed clean cover system to prevent site end users from coming into contact with made ground soils. As no topsoil is currently present on site, all capping soils will require importation.

It is considered that the clean cover system should comprise a minimum of 600mm of clean cover soils (150mm topsoil and 450mm of subsoil totalling **600mm** thick), although early consultation with the Local Authority is advised in this respect. Any imported materials to be used within the cover system should be managed in accordance with CL:AIRE "Definition of Waste Code of Practice (DoWCoP) with regard to soil movement and YALPAG – 'Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants' to ensure that any imported soils are suitable for re-use in relation to human health. The chemical testing validation rates are shown in the table below:

Source and Validation Rate	Chemical Analysis Suite		
	General Soil Suite	Asbestos	Hydrocarbons (TPHCWG)
Greenfield / Manufactured soils 1 per 250m <sup>3</sup> (minimum of 3)	✓	✓	
Brownfield / Screened soils 1 per 100m <sup>3</sup> (minimum of 6)	✓	✓	✓



---

### 8.2.2 Combustible Soils

Notwithstanding the recommendations above, all soils with a high calorific value >10MJ/kg (soils with a high coal fines content) should be excavated and removed from beneath all plot footprints and replaced with clean inert engineering fill. Likewise, all buried services which could potentially induce spark or heat should be placed in corridors of clean inert backfill to prevent the risk of ignition to any combustible soils that are present nearby. Where off-site disposal is impractical, then such soils could be retained on site and placed beneath areas of landscaping subject to approval (Local Authority & CL:AIRE). Such soils must be placed at a minimum depth of 1.0m bgl and covered with a clean inert material such as natural clay to prevent potential future combustion risk.

It is recommended that a Remediation Strategy should be completed to provide more detail on the remedial requirements and validation procedures to be agreed and approved with the NHBC and local regulatory authorities.

### 8.3 Utilities

The results of laboratory chemical tests should be provided to the appropriate utility companies to allow their assessment for the correct selection of water supply pipework.

### 8.4 Waste Disposal

Any materials which the developer intends to discard as part of the construction of the development would be classed as wastes and must be appropriately handled in accordance with current Waste Legislation. The developer should be aware of and utilise the waste hierarchy where possible – Reduce → Reuse → Recycle → Recovery → Disposal. Where materials are unable to remain on site and disposal is the only option the waste should be classified and sent to an appropriate waste receiving facility. Waste Acceptance Criteria (WAC) testing would be required by the waste receiving facility prior to disposal. It is considered that the majority of the made ground encountered is likely to be classified as non-hazardous or hazardous due to the high total organic carbon concentrations derived during these investigations. It would therefore be more practical to retain as much of the site derived soils within the development as is reasonably practical to keep disposal costs to a minimum.

If any materials are to be removed from site, this should be undertaken in accordance with Duty of Care Regulations, 1991 and the Hazardous Waste Regulations, 2005.

### 8.5 Hazardous Ground Gas

The results of the preliminary ground gas monitoring indicate that the site should be classified as CIRIA Characteristic Situation 2. Therefore, gas protection measures are considered necessary at this stage. This conclusion is subject to amendment until completion of the gas monitoring.

The site does not lie within an area where radon protection measures are required.



---

## 9. Geotechnical Conclusions

It is understood that NHL are proposing to develop 2/3 storey residential properties with associated roads, drainage and private gardens. In preparing this report, we have made assumptions on typical loadings for such a development. If any heavier loaded structures are proposed in the future, or significant changes in ground level are required then the recommendations made here may require revising.

### 9.1 Mining Hazards

#### 9.1.1 Shallow Mining

Rotary drilling did not identify evidence of underground mining beneath the site that could impact development at the surface. An intact coal was recorded in RH04 only at a depth of 8.5m (0.7m thick) which is believed to represent the Three Quarter coal seam and was not recorded in any of the other boreholes drilled. Possible broken ground or bed separation was recorded in RH06 at a depth of 25.9m bgl (0.8m thick) which ties in with a nearby BGS borehole recording waste associated with the Brockwell coal seam at c.23m bgl and indicated as being 0.6m thick.

In order to ensure stability at the surface, a minimum rock cover of 10x the worked coal seam thickness is generally considered required to maintain stability at the surface. Assuming a worst case extraction thickness of 0.8m for the Brockwell seam, a minimum rock cover of 8m should be present above this feature. As the rock cover was 23.6m, the level of rock cover is considered more than sufficient, and mitigation measures will not be required.

#### 9.1.2 Mine Entries

Two mine adits and a mine shaft are known to be present within the site. Some evidence for the location of the western most adit has been identified, which may or may not include the surface water drainage point along the northern boundary. Due to the depth of burial and poor stability of the made ground in this area, a controlled earthworks exercise will be needed to fully expose the adit entry in this area to confirm the exact location, condition and to allow treatment should this be required.

No evidence for the second adit entry in the east was found during this investigation but access was limited due to the presence of the site access road. Whilst no construction other than the incoming access road is currently proposed at this location, further investigations may be required to confirm the exact location of the adit entry in this area. Road sub-base may require geogrid reinforcement as a precautionary measure in the vicinity of the adit.

Investigations by others suggest that the former mine shaft is also present in the central/west part of the site. A concrete slab was exposed as part of that investigation which is believed to be the shaft cap although no further confirmatory investigation of this feature was carried out. From Coast's investigations, we are aware of concrete slabs in the shaft area that may represent a shaft cap, but historically there were also buildings at this location. The proximity of an access road limited investigations to fully expose all concrete.



It is therefore recommended that as part of earthworks to expose the adit, that a soil strip is carried out in and around the shaft location to fully expose this shaft cap.

Once exposed treatment through pressure grouting and/ or backfilling or provision of a new cap may be required to ensure future long-term stability. Appropriate licencing and permits will need to be secured from the Coal Authority prior to such remedial works being undertaken.

## 9.2 Foundation Options

The investigation recorded made ground deposits at thicknesses up to 4.2m within the northern extent of the upper plateau located in the west (TT01). Generally made ground in this location of the site is >2.0m thick. Made ground thicknesses generally decrease to the central south (<1.0m thick) but remain between 1-2m thick in the east at lowest elevation within the site. Natural deposits beneath the made ground comprise firm to stiff glacial till or medium dense glacial sand overlying bedrock at shallow depth. Due to the variability and potential for unacceptable high total and differential settlement, the made ground is not considered suitable as a bearing stratum.

It is considered that subject to site levels or any remodelling of the site, that a mix of foundation options will be needed. Due to the depth of the made ground in the west and north west, conventional shallow spread footings will not be feasible or economic due to the depth of excavation and high likelihood of excavation collapse resulting in excessive concrete overpour. It is considered that the following foundation types will generally be applicable for specific areas:

- Central and eastern area - Conventional strip or trench fill footings will be appropriate in areas where made ground is thin <2.0m thick (subject to trees). In these areas it is considered that the medium strength clay or medium dense sand will provide an allowable safe bearing capacity of 100kPa.
- Western and north western area - Deep foundations such as piles or vibro-stone columns may be better suited taken to and bearing in the underlying (glacial till/ rock).

It is recommended that this report is provided to a piling/ vibro-specialist to confirm the suitability for each method and to allow budget costs to be determined.

Foundations should bear wholly within soils of similar characteristics (clay OR sand) to minimise the potential for differential settlement. Otherwise, appropriate reinforcement should be included in the footing.

Based on the low volume change potential of the glacial clay, the minimum foundation depth will be 750mm subject to consideration of existing or proposed planting.

## 9.3 Development Near Trees

Trees are present along the boundaries of the site. Consequently, foundation depths in cohesive soils may require increasing in proximity to these areas in accordance with NHBC



Chapter 4.2. It is recommended that a tree survey is undertaken to confirm the extent of precautions that may be required.

#### 9.4 Floor Slabs

Ground bearing slabs are not considered to be appropriate for this development as the thickness of made ground is greater than 600mm. Suspended floor slabs with a minimum 150mm sub-floor void will be required for all plots.

#### 9.5 Roads and Pavements

Based on the ground conditions encountered and in general accordance with Interim Advice Note 73/06 Revision 1 (2009) Design Guidance for Road Pavement Foundations (Draft HD25), for the made ground colliery spoil a design CBR of 2% should be adopted. Within the natural cohesive soils a design CBR of 3% is suggested based on soil plasticity. Where sand is present at formation, then a design CBR of 10% should be adopted to account for variations in soil make up across the site, although this should also be verified at formation level.

Any soft spots encountered in the prepared surface should be removed and replaced with appropriate engineering fill.

Highway design should be agreed with the local highways department before work begins on site.

#### 9.6 Groundworks

Generally, excavations within the made ground and natural soils should be achievable using conventional plant. However, excavations within the made ground and granular natural soils are unlikely to remain stable in the short-term based on observations during this investigation. Therefore, support and battering back of temporary excavations should be undertaken as required, in accordance with CIRIA Report 97 Trenching Practice (2nd Edition 2001).

Former inground obstructions (floor slabs and foundations) associated with the former colliery and other buildings have been recorded in some parts of the site. Such features will need to be broken out and removed to prevent difficulties during foundation formation. The resultant excavations will need to be mindful of the proposed development layout and will require controlled backfilling to an approved engineering specification.

In addition, potentially unrecorded buried services (culverts for the former and existing stream) are anticipated to be present within the site. It is recommended that identifiable service entry points are exposed and surveyed to allow accurate excavation and diversion or removal.

Due to the presence of a steep slope at the north western section of the site, it is recommended that no excavation works, or load bearing development is undertaken in close proximity to the slope crest to prevent the risk of slope instability and failure.



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## 9.7 Concrete

Thirteen samples of made ground and eleven samples from natural deposits were tested for water soluble sulphate and pH.

Due to the potential generation of additional sulphates as a result of iron pyrites within the colliery spoil, additional sulphur analysis was undertaken to determine the total potential sulphate (TPS % S) concentrations in line with BRE Special Digest 1, 2005, 3rd Edition.

For made ground, the results recorded water soluble sulphate at concentrations between 45mg/l and 1721mg/l and pH values between 3.7 and 12.5. Total potential sulphate derived in accordance with BRE was 2.1 (SO<sub>4</sub> %). Based on the worst case results of TPS and water soluble sulphate, the design sulphate class is DS-4 and ACEC class of AC-3.

For natural ground, the results indicate water soluble sulphate at concentrations between 10 and 290 mg/l and pH values between 6.8 and 8.5 which equates to a design sulphate class of DS-1 and ACEC class of AC-1 for concrete in accordance with BRE Special Digest 1, 2005, 3rd Edition.

It is recommended that all concrete placed within contact with any colliery spoil is designed to DS-4 and ACEC class AC-3 to resist concrete decay.

## 9.8 Drainage

Given the predominance of low permeability soils, the depths of made ground and the potential to destabilise proposed foundations it is considered that the site is not suitable for a soakaway drainage solution.

## 9.9 Slope Stability

A 3-4m high vegetated slope is present along the northern boundary which does not show any significant signs of disturbance or movement. However, it is recommended that all new development and development enabling works maintain an appropriate safe distance from the crest of this slope to ensure stability. Should development or works be required on or immediately adjacent to the slope then further specific investigation and or assessment will be required.



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## 10. Additional Works

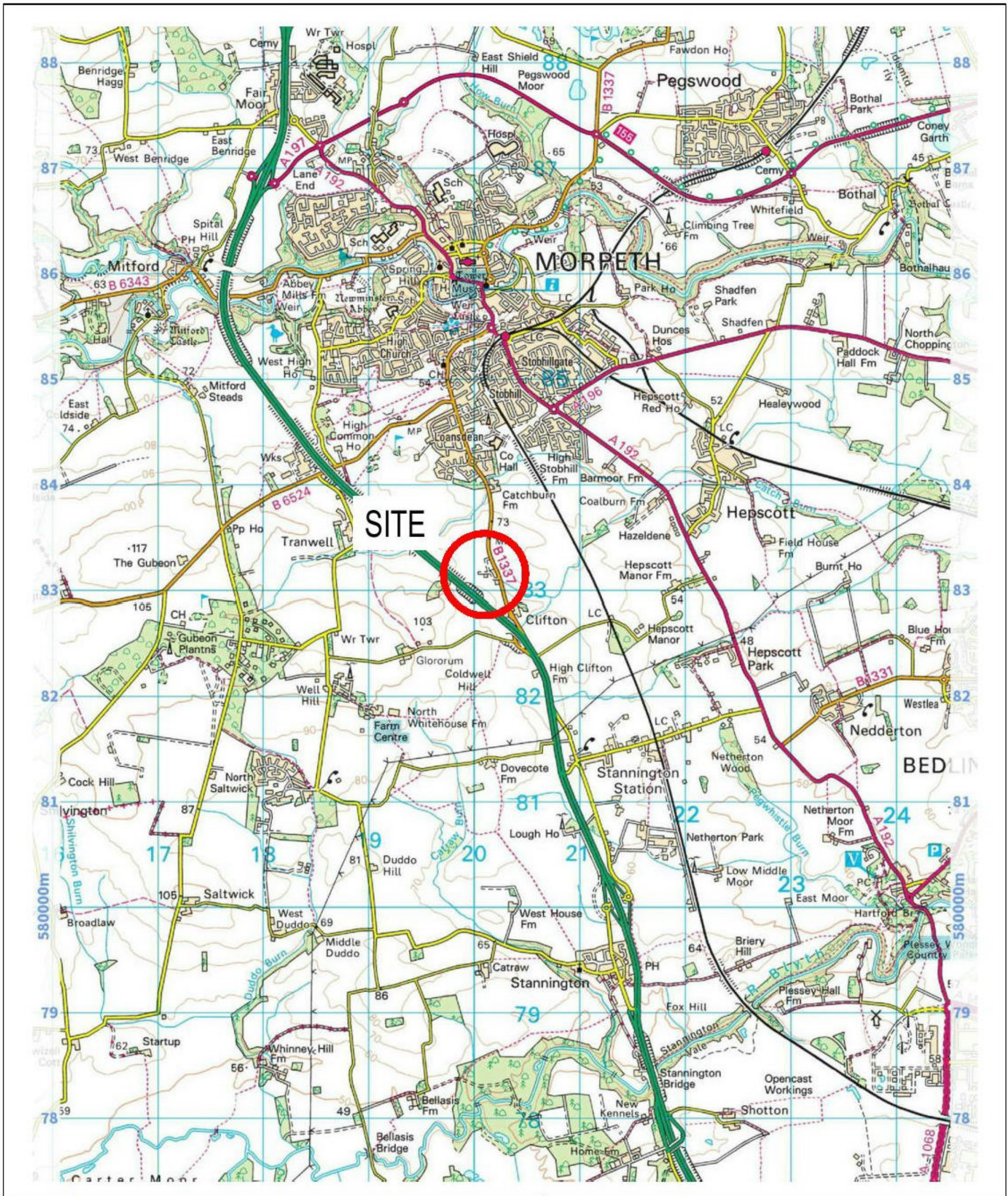
Based on the findings of the desk study and ground investigation, the following works will be required for planning purposes:


- Completion of the gas monitoring and issue of a final gas risk assessment.
- Production of a Remediation Strategy report to detail the measures necessary to cap the made ground with clean soils.
- Production of a Materials Management Plan (MMP) (subject to soils re-use within the site).
- Controlled earthworks to expose and locate the two mine adits and mine shaft.
- Carry out validation testing of the installed clean capping soils.



## Appendix A – Figures



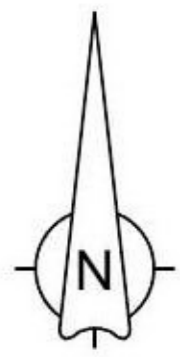


Client				
Northumbria Homes Ltd				
Project				
Clifton, Morpeth				
Drawing Title				
Site Location Plan				
Job No	Drawing No	Issue	Scale at A4	7 Silvertown Court, Northumberland Business Park, NE23 7RY rh@coastconsult.co.uk pl@coastconsult.co.uk 0191 5977879
20004	01	P1	1:50,000	

© Coast Consulting Engineers Ltd.			
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Do not scale





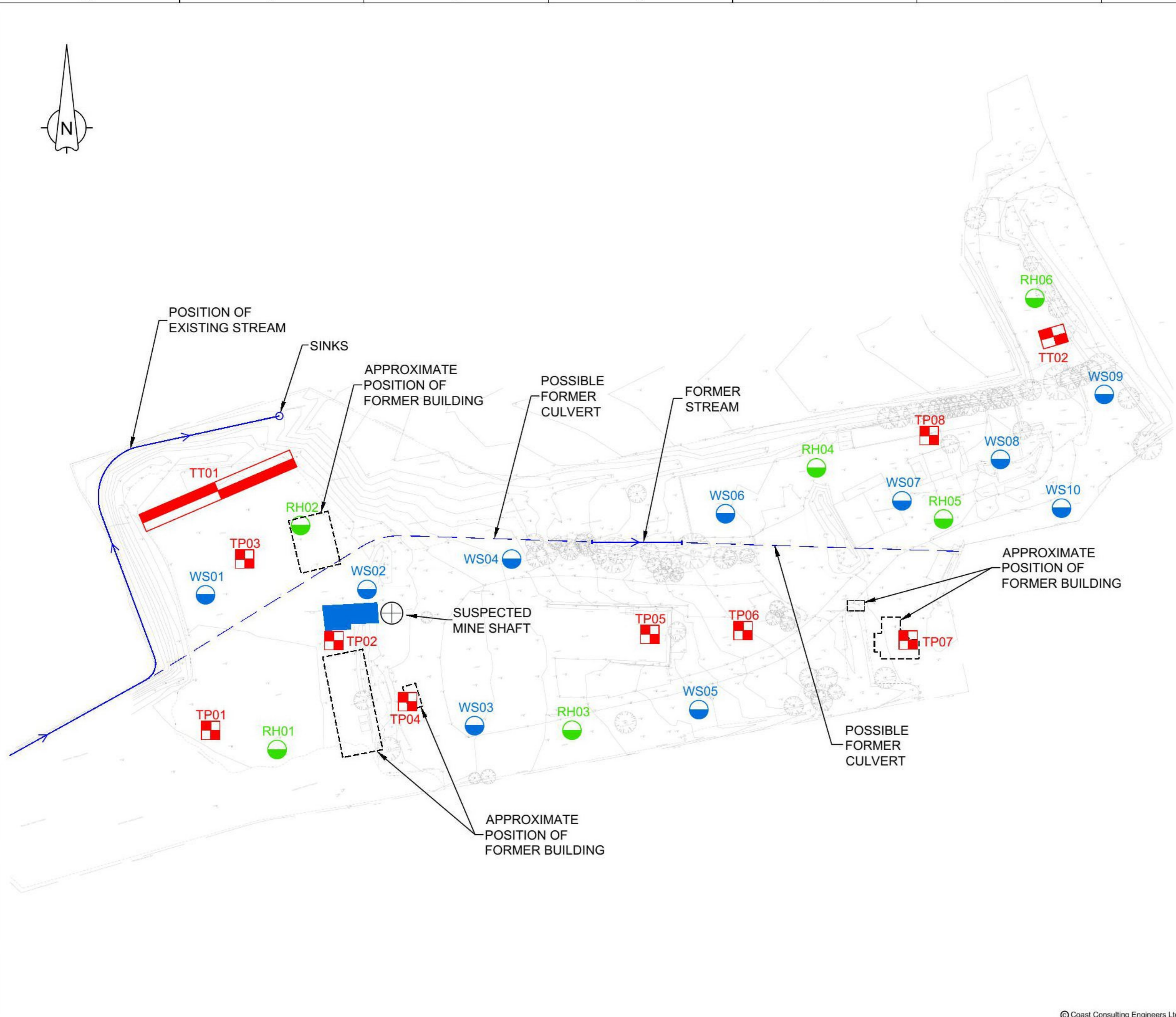
1

2

3

4

5



**KEY:**

- TP01 TRIAL PIT/TRIAL TRENCH
- WS01 WINDOW SAMPLE
- RH01 ROTARY HOLE
- ADIT/MINE SHAFT EXCAVATION
- SUSPECTED MINESHAFT

Issue	Date	Description	By
P2	04-05-21	Additional information added	GW
P1	19-04-21	Preliminary Issue	AT



7 Silvertown Court, Northumberland Business Park, NE23 7RY  
0191 5977879

Client  
**Northumbria Homes Ltd**

Job Title  
**Clifton, Morpeth**

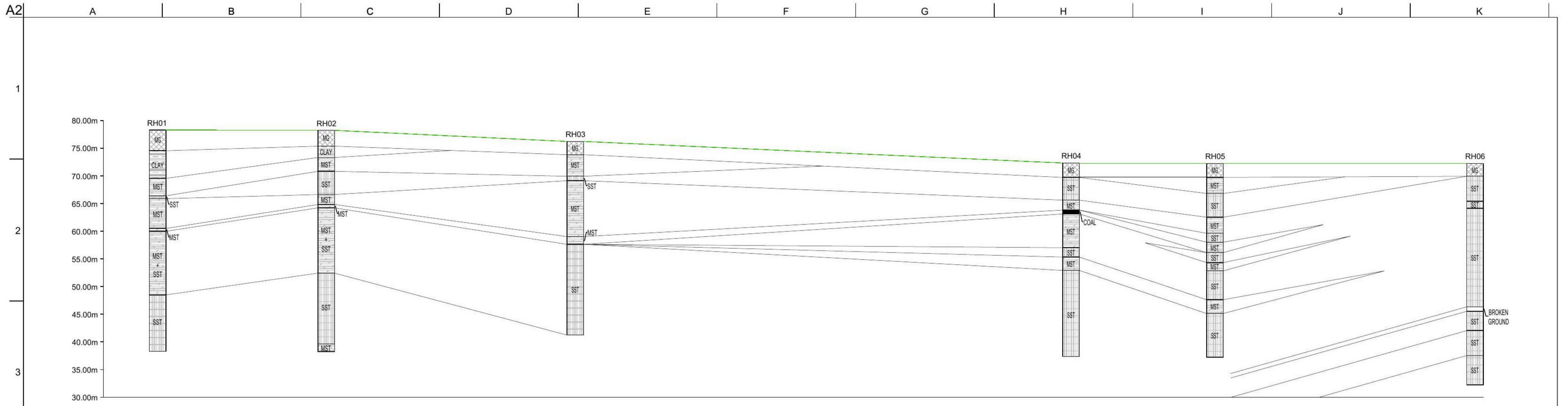
Drawing Title  
**Exploratory Hole Location Plan**

Scale at A3  
1:1000

Drawing Status  
**PRELIMINARY**

Job No <b>20004</b>	Drawing No <b>02</b>	Issue <b>P2</b>
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**GEOLOGICAL CROSS SECTION**  
SCALE 1:500



**KEY PLAN**  
SCALE 1:1000

**KEY:**

- ROTARY BOREHOLE
- MG MADE GROUND
- SST SANDSTONE
- MST MUDSTONE

Issue	Date	Description	By	Chkd	Appd
P1	XX.04.21	Preliminary Issue	GW	SHJ	AC



7 Silvertown Court, Northumberland Business Park, NE23 7RY  
0191 5977879

Client  
**Northumbria Homes Ltd**

Job Title  
**Clifton, Morpeth**

Drawing Title  
**Geological Cross Section**

Scale at A2  
Section 1:500, Key Plan, 1:1000

Drawing Status  
**PRELIMINARY**

Job No <b>20004</b>	Drawing No <b>03</b>	Issue <b>P1</b>
------------------------	-------------------------	--------------------



**KEY**

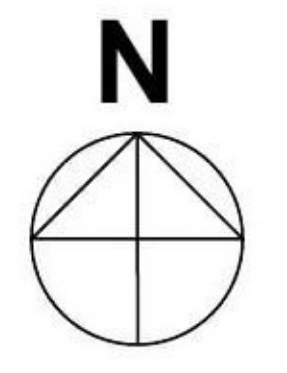
- Boundary
- Acoustic Barrier
- NWL 13m EASEMENT
- P.O.S
- ADOPTED RD SURFACE
- VISITOR PARKING SURFACE
- EXISTING TREES
- PROPOSED TREES
- REMOVED TREES

**NOTE:**

PARKING REQUIREMENTS ARE AS PER NCC STANDARDS AND THE ADOPTED RD NETWORK IS A MINIMUM OF 4.8M WIDE THROUGHOUT.

AUTOTRACK, VISIBILITY SPLAY, GHOST ISLAND AND PEDESTRIAN LINK HAVE BEEN ADDED FOR CLARITY

- Notes**
1. Do not scale from this drawing. If in doubt ask.
  2. Contractor to check all dimensions on site prior to the commencement of works and report any discrepancies to the Architect immediately.
  3. To be read in conjunction with all other drawings, bills and specification documents.
  4. Cross refer to structural engineers design for all structural information.



Pedestrian link & Ghost Island formed in accordance with Standards for Highways Specifications

2m wide tarmac Footpath created to link the site to the bus stop to the South



Rev	Date	Description	Rev by	Checked
B	28/01/15	Layout updated to show footpath link from the site to southern bus stop	ND	
A	11/11/14	Layout revised following comments received from NCC Consultees	ND	

Status: STAGE D - PLANNING

**idp PARTNERSHIP**  
IAN DARBY PARTNERSHIP  
**SCOTLAND**

95 South Woodside Road, Glasgow G20 6NT  
Tel: 0141 342 5400 Fax: 0141 342 5401 Email: info@idpartnership-scotland.com  
New Client  
Proposed residential development, Clifton Caravan Park, Clifton, Morpeth for Broadie Developments

Drawing Title: Site Plan as proposed

Project Architect	ND	Drawn by	ND	Checked by	-
Scale: A1	1:500@A1	Rev Number	1185	Drawing Number	L001 B
Date	05.05.14				

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## Appendix B – Exploratory Hole Logs





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
**TP01**

<b>Machine :</b> JCB 3CX <b>Method :</b> Mechanical Excavator	<b>Dimensions</b> 0.90 x 4.00	<b>Ground Level (mOD)</b> 78.30	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 16/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	ES1					MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles and boulders of sandstone, siltstone and mudstone (COLLIERY SPOIL).		
1.00	D1				(2.50)			
2.70	D2			75.80	2.50 (0.50)	Greenish grey mottled black silty slightly gravelly SAND (POSSIBLE RELICT SUBSOIL).		
				75.30	3.00	Complete at 3.00m		

<b>Plan</b> 	<b>Remarks</b> Continuous collapse of trial pit within colliery spoil unable to advance below 3.0m bgl. Heavy water seepage within made ground from 2.0m bgl.		
		<table border="1"> <tr> <td><b>Scale (approx)</b> 1:25</td> <td><b>Logged By</b> SHJ</td> <td><b>Figure No.</b> 20004.TP01</td> </tr> </table>	<b>Scale (approx)</b> 1:25
<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP01	





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP02

**Machine :** JCB 3CX  
**Method :** Mechanical Excavator

**Dimensions**  
0.90 x 4.00

**Ground Level (mOD)**  
77.80

**Client**  
Northumbria Homes

**Job Number**  
20004

**Location**  
Northumberland

**Dates**  
16/03/2021

**Engineer**  
S Jones

**Sheet**  
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	ES1					MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles and boulders of sandstone, siltstone and mudstone including fragments of metal, timber and brick (COLLIERY SPOIL).  1m wide pocket of soft white clay material between 1.4m and 1.7m bgl.		
1.00	D1			(2.00)				
1.50	ES2							
				75.80 75.75	2.00 2.05	MADE GROUND: Grey CONCRETE (Former structure slab). Complete at 2.05m		

**Plan**

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**Remarks**

Trial pit unstable within colliery spoil. Concrete obstruction at 2.0m bgl (Former structure floor slab).

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP02
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Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP03

<b>Machine :</b> JCB 3CX <b>Method :</b> Mechanical Excavator	<b>Dimensions</b> 0.90 x 4.00	<b>Ground Level (mOD)</b> 77.65	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 16/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.80	ES1					MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles of sandstone, siltstone and mudstone including fragments of metal, metal wire rope, timber and brick (COLLIERY SPOIL).		
1.00	D1							
2.50	D2				(3.60)			
3.70	D3			74.05	3.60 (0.30)	Soft to firm closely fissured brown mottled grey very sandy CLAY (GLACIAL TILL).		
4.00 4.00	HSV 90kPa D4			73.75	3.90	Stiff dark grey sandy gravelly CLAY with frequent angular cobbles of sandstone. Gravel is angular to sub-angular finr		

**Plan**

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**Remarks**

Trial pit unstable within colliery spoil. Water seepage in colliery spoil at 3.5m bgl.

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP03
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Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP03

**Machine :** JCB 3CX  
**Method :** Mechanical Excavator

**Dimensions**  
0.90 x 4.00

**Ground Level (mOD)**  
77.65

**Client**  
Northumbria Homes

**Job Number**  
20004

**Location**  
Northumberland

**Dates**  
16/03/2021

**Engineer**  
S Jones

**Sheet**  
2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				73.25	0.50	to coarse of mixed lithologies (GLACIAL TILL).		
					4.40	Complete at 4.40m		

**Plan**

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**Remarks**

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP03
-------------------------------	-------------------------	---------------------------------









Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP05

<b>Machine :</b> JCB 3CX <b>Method :</b> Mechanical Excavator	<b>Dimensions</b> 0.90 x 4.00	<b>Ground Level (mOD)</b> 75.77	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 16/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				75.74	0.03	MADE GROUND: Dark grey ASPHALT.		
0.80	ES1					MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles and boulders of sandstone, siltstone and mudstone including fragments of metal, timber and brick (COLLIERY SPOIL).		
1.00	D1				(2.17)			
2.30	D2			73.57	2.20 (0.20)	MADE GROUND: Black sandy angular fine GRAVEL of coal.		
2.50	D3			73.37	2.40 (0.50)	Greenish grey silty SAND with fine coal speckles (RELICT SUBSOIL).		
3.00	D4			72.87	2.90 (0.90)	Firm brown very sandy gravelly CLAY. Gravel is sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).		
				71.97	3.80	Complete at 3.80m		

<b>Plan</b> 	<b>Remarks</b> Trial pit unstable within colliery spoil.		
	<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP05





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP06

**Machine :** JCB 3CX  
**Method :** Mechanical Excavator

**Dimensions**  
0.90 x 4.00

**Ground Level (mOD)**  
73.00

**Client**  
Northumbria Homes

**Job Number**  
20004

**Location**  
Northumberland

**Dates**  
16/03/2021

**Engineer**  
S Jones

**Sheet**  
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	ES1			72.70	0.30	MADE GROUND: Light brown rounded medium GRAVEL overlying pink angular fine to coarse gravel of burnt red shale.		
					0.50	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of sandstone, siltstone and mudstone with rare timber sleepers and brick (COLLIERY SPOIL).		
2.00	D1			72.20	0.80	Greenish grey silty SAND with fine coal speckles and rare cobbles of sandstone (RELICT SUBSOIL).		
					1.35	Light brown and grey moist very silty gravelly cobbly medium to coarse SAND (GLACIAL TILL).		
2.50	HSV 50kPa			71.65	2.10	Firm brown and grey very sandy gravelly CLAY. Gravel is sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).		
3.00	D2			70.90	(1.10)			
3.50	HSV 95kPa			69.80	3.20	Stiff dark grey sandy gravelly CLAY with frequent angular cobbles of sandstone. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).		
				69.10	(0.70)			
					3.90	Complete at 3.90m		

**Plan**

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**Remarks**

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP06
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Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TP08

<b>Machine :</b> JCB 3CX <b>Method :</b> Mechanical Excavator	<b>Dimensions</b> 0.90 x 4.00	<b>Ground Level (mOD)</b> 71.70	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 16/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40	ES1			71.67	0.03	MADE GROUND: Dark grey ASPHALT.		
					(0.32)	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of sandstone, siltstone and mudstone with rare timber sleepers and brick (COLLIERY SPOIL).		
1.00	D1			71.35	0.35	MADE GROUND: Pink and brown sandy angular fine to coarse GRAVEL of burnt shale (COLLIERY SPOIL).		
				71.20	(0.15)			
2.00	D2				0.50	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of sandstone, siltstone and mudstone with rare timber sleepers and brick (COLLIERY SPOIL).		
					(0.40)			
3.50	D3			70.80	0.90	MADE GROUND: Pink mottled grey and orange sandy angular fine to coarse GRAVEL of burnt shale (COLLIERY SPOIL).		
				70.70	(0.10)			
					1.00	Brown silty gravelly medium to coarse SAND with occasional cobbles (GLACIAL SAND).		
					(2.25)			
				68.45	3.25	Extremely weak grey brown thinly laminated MUDSTONE (PENNINE LOWER COAL MEASURES).		
				68.20	3.50	Complete at 3.50m		

<b>Plan</b> 	<b>Remarks</b>		
	<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TP08





Coast Consulting Engineers Ltd  
 7 Silverton Court  
 Northumberland Business Park  
 NE23 7RY

**Site**  
 Ideal Caravans, Clifton

**Trial Pit Number**  
**TT01**

**Machine :** 360 Tracked Excavator  
**Method :** Mechanical Excavation

**Dimensions**  
 0.90 x 29.00

**Ground Level (mOD)**  
 77.60

**Client**  
 Northumbria Homes

**Job Number**  
 20004

**Location**  
 Northumberland

**Dates**  
 16/03/2021

**Engineer**  
 S Jones

**Sheet**  
 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
2.75	ES1				(4.20)	<p>MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles and boulders of sandstone, siltstone and mudstone (COLLIERY SPOIL).</p> <p>East end of pit: brown gravelly cobbly SAND with brick, timber and metal fragments with dark grey pockets of silty sand with moderate hydrocarbon odour</p>		

Plan										
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**Remarks**

Trial Trench unstable in colliery spoil and made ground. Water seepages at base of made ground. Refer to sketch drawing.

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TT01
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Coast Consulting Engineers Ltd  
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NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Trial Pit Number**  
TT02

**Machine :** 360 Tracked Excavator  
**Method :** Mechanical Excavation

**Dimensions**  
0.90 x 6.50

**Ground Level (mOD)**

**Client**  
Northumbria Homes

**Job Number**  
20004

**Location**  
Northumberland

**Dates**  
16/03/2021

**Engineer**  
S Jones

**Sheet**  
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	MADE GROUND: Dark grey ASPHALT.		
					(2.10)	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with frequent cobbles and boulders of sandstone, siltstone and mudstone (COLLIERY SPOIL).		
					2.15	Stiff brownish grey very sandy gravelly slightly cobbly CLAY. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).		
					(1.05)			
					3.20 3.25	Brownish grey thinly bedded SILTSTONE/ SANDSTONE (PENNINE LOWER COAL MEASURES). Complete at 3.25m		

**Plan**

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**Remarks**

Trial Trench unstable in colliery spoil and made ground. Water seepages within made ground from 1.7m bgl.

<b>Scale (approx)</b> 1:25	<b>Logged By</b> SHJ	<b>Figure No.</b> 20004.TT02
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7 Silverton Court  
Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS01**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 77.70	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 29/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=6		1,1/1,1,2,2		(2.40)	MADE GROUND: Grey mottled brown and black clayey silty fine to coarse SAND AND angular fine to coarse GRAVEL (COLLIERY SPOIL).			
2.00-2.45	SPT N=8		1,1/2,2,2,2	75.30	2.40 (0.30)	MADE GROUND: Vegetation remains overlying greenish grey slightly silty SAND (RELIC TOPSOIL AND SUBSOIL)			
3.00-3.45	SPT N=14		2,2/2,3,4,5	75.00	2.70	Stiff grey very sandy gravelly CLAY with occasional cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).			
4.00-4.39	SPT 30/240		10,10/30	73.53	4.17	Complete at 4.17m			

Remarks SPT refusal at 4.165	Scale (approx)	1:40	Logged By	SHJ
	Figure No.	20004.WS01		





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Site  
Ideal Caravans, Clifton

Number  
**WS02**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 77.30	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 29/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=6		1,1/1,2,1,2	76.00	1.30 (1.30)	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of sandstone, siltstone and mudstone (COLLIERY SPOIL).			
				75.80	0.20 (0.20)	MADE GROUND: Grey CONCRETE.			
2.00-2.45	SPT N=11		1,2/2,3,4,2	75.00	1.50 (0.80)	Greenish grey mottled black silty slightly gravelly SAND (POSSIBLE RELICT SUBSOIL).			
3.00-3.45	SPT N=10		2,2/2,2,3,3	74.15	2.30 (0.85)	Medium dense brown silty gravelly medium to coarse SAND (GLACIAL SAND).			
4.00-4.45	SPT N=14		2,3/3,3,4,4		3.15 (2.30)	wet below 3.0m bgl. Stiff grey very sandy gravelly CLAY with occasional cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).			
5.00-5.45	SPT N=18		3,4/4,4,5,5	71.85	5.45	Complete at 5.45m			

Remarks	Scale (approx)	1:40	Logged By	SHJ
	Figure No.	20004.WS02		





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Site  
Ideal Caravans, Clifton

Number  
**WS03**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 76.45	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 29/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.55	ES1			76.40	0.05 (0.15)	MADE GROUND: Dark grey ASPHALT.			
				76.25	0.20 (0.29)	MADE GROUND: Grey and pink sandy angular fine to coarse GRAVEL of limestone and red shale.			
				75.96	0.49 (0.16)	MADE GROUND: Stiff greenish grey mottled black very sandy gravelly CLAY with occasional cobbles of sandstone.			
1.00-1.45	SPT N=8		1,1/2,2,2,2	75.80	0.65 (0.45)	MADE GROUND: Grey clayey gravelly SAND with small pockets of coal fines.			
1.40	HSV 76kPa			75.35	1.10	Firm greenish grey very sandy slightly gravelly CLAY (POSSIBLE RELICT SUBSOIL).			
1.80	HSV 70kPa				(1.60)	Firm locally stiff grey brown very sandy very gravelly CLAY (GLACIAL TILL)			
2.00-2.45	SPT N=11		2,2/3,2,3,3						
2.20	HSV 80kPa								
2.60	HSV 80kPa								
2.90	HSV 75kPa			73.75	2.70	Stiff grey very sandy gravelly CLAY with occasional cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).			
3.00-3.45	SPT N=13		2,2/3,3,3,4						
3.50	HSV 70kPa					...becomes firm below 3.5m bgl.			
4.00-4.45	SPT N=14		3,3/3,3,4,4		(2.75)				
4.20	HSV 50kPa								
5.00-5.45	SPT N=16		3,4/3,4,4,5						
				71.00	5.45	Complete at 5.45m			

<b>Remarks</b>	<b>Scale (approx)</b> 1:40	<b>Logged By</b> SHJ
	<b>Figure No.</b> 20004.WS03	





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Site  
Ideal Caravans, Clifton

Number  
**WS04**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 75.60	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 29/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.90 1.00-1.45	ES1 SPT N=8		1,2/2,1,2,3	75.55	0.05	MADE GROUND: Grey angular fine to medium GRAVEL of limestone.			
					(0.75)	MADE GROUND: Grey and pink sandy slightly clayey angular fine to coarse GRAVEL of limestone, sandstone and red shale with occasional coal.			
2.00-2.45	SPT N=13		2,3/3,3,3,4	74.80	0.80	MADE GROUND: Dark grey to black sandy angular fine GRAVEL of coal and shale (COLLIERY SPOIL).			
				74.50	1.10	Loose to medium dense orange brown silty very gravelly medium to coarse SAND with occasional sub-rounded cobbles of sandstone (GLACIAL SAND).			
3.00-3.45	SPT N=13		3,3/2,3,4,4	73.30	2.30	Medium dense wet brown medium SAND (GLACIAL SAND).			
					(1.10)	wet below 3.0m bgl.			
4.00-4.45	SPT N=15		3,3/3,4,4,4	72.20	3.40	Stiff grey very sandy gravelly CLAY with occasional cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies (GLACIAL TILL).			
					(2.05)				
5.00-5.45	SPT N=19		4,4/5,4,5,5	70.15	5.45	Complete at 5.45m			

Remarks	Scale (approx)	Logged By
	1:40	SHJ
	Figure No. 20004.WS04	





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NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS05**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 74.70	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 29/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=9	1,1/2,2,3,2		74.67	0.03	MADE GROUND: Grey angular fine to medium GRAVEL of limestone.			
				74.55	(0.12) 0.15				
2.00-2.45	SPT N=9	2,2/2,2,2,3		74.15	(0.40)	MADE GROUND: Pink sandy angular fine to coarse GRAVEL of red shale.			
					0.55	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of sandstone, siltstone and mudstone (COLLIERY SPOIL).			
3.00-3.45	SPT N=10	2,2/2,2,3,3		72.50	(1.65)				Loose grey and brown mottled orange very silty gravelly fine to medium SAND (GLACIAL SAND).
					2.20	Medium dense grey very silty slightly gravelly SAND (GLACIAL SAND).			
4.00-4.45	SPT N=14	3,3/3,4,3,4		69.25	(3.25)	Complete at 5.45m			
5.00-5.45	SPT N=18	3,4/4,5,4,5			5.45				

Remarks	Scale (approx)	Logged By
	1:40	SHJ
	Figure No. 20004.WS05	





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Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS06**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 72.00	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 29/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=10		1,1/2,3,2,3	71.95	0.05	MADE GROUND: Dark grey ASPHALT.			
					(1.05)	MADE GROUND: Grey mottled brown and black slightly silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).			
				70.90	1.10	Firm to stiff brown mottled grey very sandy slightly gravelly CLAY (GLACIAL TILL).			
2.00-2.45	SPT N=10		2,2/2,3,3,2	70.50	1.50	Damp brown very silty fine to medium SAND (GLACIAL SAND).			
					(0.75)				
2.50-2.88	SPT 35/230		16,12/35	69.75	2.25	Extremely weak weathered light brown grey thinly bedded SANDSTONE (PENNINE LOWER COAL MEASURES)			
				69.34	2.66	Complete at 2.66m			

Remarks Sampler refusal at 2.5m bgl.	Scale (approx)	Logged By
	1:40	SHJ
	Figure No. 20004.WS06	





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS07**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 71.60	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 30/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.75	ES1			71.55	0.05	MADE GROUND: Dark grey ASPHALT.			
1.00-1.45	SPT N=9		1,2/2,2,3,2	71.39	0.21	MADE GROUND: Pink sandy angular fine to coarse GRAVEL of red shale.			
2.00-2.45	SPT N=13		2,3/3,3,3,4	69.60	2.00	MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).			
2.40	D1				(0.90)	Medium dense brown very silty gravelly fine to medium SAND (GLACIAL SAND).			
3.00-3.38	SPT 43/230		8,11/13,30	68.70	2.90	Extremely weak weathered light brown grey thinly bedded SANDSTONE (PENNINE LOWER COAL MEASURES)			
				68.37	3.23	Complete at 3.23m			

Remarks Sampler refusal at 3.0m bgl.	Scale (approx)	1:40	Logged By	SHJ
	Figure No.	20004.WS07		





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7 Silverton Court  
Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS08**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 71.00	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 30/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=14		1,2/3,3,4,4	70.00	1.00	MADE GROUND: Turf over red brown sandy angular fine to coarse GRAVEL of red shale and sandstone (COLLIERY SPOIL).			
2.00-2.45	SPT N=23		4,5/4,6,6,7	68.95	2.05	MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL). ...becomes wet below 1.5m bgl.			
3.00-3.45	SPT N=14		3,3/3,3,4,4	68.00	3.00	Brown mottled grey silty gravelly fine to medium SAND (GLACIAL SAND).			
3.45-3.83	SPT 50*/80 0/295		15,35/	67.47	3.53	Extremely weak weathered grey SANDSTONE (COBBLE/ ROCK of PENNINE LOWER COAL MEASURES).  Complete at 3.53m			

Remarks	Scale (approx)	Logged By
	1:40	SHJ
	Figure No. 20004.WS08	





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7 Silverton Court  
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NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS09**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 71.20	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 30/03/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45 1.00	SPT N=9 D1		1,1/2,2,2,3	71.15	0.05 (0.25)	MADE GROUND: Red brown angular coarse GRAVEL of granite.			
				70.90	0.30 (0.60)	MADE GROUND: Dark grey and black SAND AND angular fine to medium GRAVEL of burnt shale, cinders and ash.			
2.00-2.45 2.00	SPT N=14 D2		2,3/3,4,3,4	70.30	0.90 (0.50)	MADE GROUND: Pink sandy angular fine to coarse GRAVEL of red shale and siltstone.			
				69.80	1.40 (1.20)	MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).			
2.80-3.19	SPT 38/235		8,10/13,25	68.60	2.60 (0.44)	Firm to stiff brown mottled grey very sandy CLAY (GLACIAL TILL).			
				68.16	3.04	Extremely weak weathered grey thinly bedded SANDSTONE (PENNINE LOWER COAL MEASURES).			
						Complete at 3.04m			

<b>Remarks</b> Sampler refusal at 2.8m bgl.	<b>Scale (approx)</b> 1:40	<b>Logged By</b> SHJ
	<b>Figure No.</b> 20004.WS09	





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Number  
**WS10**

Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 71.00	Client Northumbria Homes	Job Number 20004
	Location Northumberland	Dates 30/03/2021	Engineer S Jones	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00-1.45	SPT N=6		1,1/1,1,2,2	70.95	0.05	MADE GROUND: Red brown angular coarse GRAVEL of granite.			
					(1.25)	MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).			
2.00-2.45 2.00	SPT N=11 D1		2,2/2,3,3,3	69.70	1.30 (0.40)	Greenish grey silty fine to medium SAND (GLACIAL SAND).			
				69.30	1.70 (1.10)	Medium dense brown very silty very gravelly medium to coarse SAND (GLACIAL SAND).			
3.00-3.38	SPT 45/225		8,11/15,30	68.20	2.80 (0.43)	Extremely weak weathered grey thinly bedded SANDSTONE (PENNINE LOWER COAL MEASURES).			
				67.77	3.23	Complete at 3.23m			

Remarks Sampler refusal at 3.0m bgl.	Scale (approx)	Logged By
	1:40	SHJ
	Figure No. 20004.WS10	





Coast Consulting Engineers Ltd  
7 Silverton Court  
Northumberland Business Park  
NE23 7RY

Site  
Ideal Caravans, Clifton

Borehole Number  
**R01**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 78.30	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						74.55	3.75	Firm grey gravelly CLAY (GLACIAL TILL).		
							(5.00)			
						69.55	8.75	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(3.15)			
						66.40	11.90	Light grey SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(0.50)			
						65.90	12.40	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		

<b>Remarks</b> No gases detected. No evidence of worked coal seams detected.	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R01	





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7 Silverton Court  
Northumberland Business Park  
NE23 7RY

**Site**  
Ideal Caravans, Clifton

**Borehole Number**  
**R01**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 78.30	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(5.40)			
						60.50	17.80 (0.50)	Dark grey carbonaceous MUDSTONE (PENNINE LOWER COAL MEASURES).	Grade II	
						60.00	18.30	Light grey MUDSTONE with SANDSTONE bands (PENNINE LOWER COAL MEASURES).	Grade II	
							(11.50)			
						48.50	29.80	Light brown SANDSTONE (PENNINE LOWER COAL		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R01	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R01**

<b>Machine :</b> Flush : Air/mist Core Dia: mm Method : Rotary Openhole		<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 78.30	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
		<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MEASURES).		
							(10.20)			
						38.30	40.00	Water strike at 39.8m bgl. Complete at 40.00m		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R01	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R02**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 77.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						74.75	2.85	Firm brown gravelly CLAY (GLACIAL TILL).		
						72.70	4.90	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
						70.20	7.40	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
						66.00	11.60	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
						64.20	13.40	Dark grey carbonaceous MUDSTONE (PENNINE LOWER COAL MEASURES).		Grade II
						63.60	14.00	Light grey MUDSTONE with SANDSTONE bands (PENNINE LOWER COAL MEASURES).		Grade II

<b>Remarks</b> No gases detected. No evidence of worked coal seams detected.	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R02	





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**Site**  
 Ideal Caravans, Clifton

**Borehole Number**  
**R02**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 77.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(11.80)			
						51.80	25.80	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES). Water strike at 25.8m bgl.		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R02	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R02**

<b>Machine :</b> Flush : Air/mist Core Dia: mm Method : Rotary Openhole		<b>Casing Diameter</b>		<b>Ground Level (mOD)</b> 77.60		<b>Client</b> Northumbria Homes		<b>Job Number</b> 20004	
		<b>Location</b> Northumberland		<b>Dates</b> 01/04/2021		<b>Engineer</b> S Jones		<b>Sheet</b> 3/3	

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(12.80)			
								Partial flush loss at 36.7m bgl.		
						39.00	38.60	Light grey interbedded MUDSTONE and SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(1.40)			
						37.60	40.00	Complete at 40.00m		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:75	
	<b>Figure No.</b> 20004.R02	





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**Site**  
Ideal Caravans, Clifton

**Borehole Number**  
**R03**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 75.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						73.20	2.40	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(3.90)			
						69.30	6.30 (0.80)	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
						68.50	7.10	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(10.10)			

<b>Remarks</b> No gases detected. No evidence of worked coal seams detected.	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R03	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R03**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 75.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						58.40	17.20	Dark grey carbonaceous MUDSTONE (PENNINE LOWER COAL MEASURES).	Grade II	
							(1.40)		Grade II	
						57.00	18.60	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).	Grade II	
							(16.40)		Grade II	

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R03	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R03**

<b>Machine :</b> Flush : Air/mist Core Dia: mm Method : Rotary Openhole		<b>Casing Diameter</b>		<b>Ground Level (mOD)</b> 75.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
		<b>Location</b> Northumberland		<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						40.60	35.00	Complete at 35.00m		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R03	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R04**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.70	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						69.10	2.60	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(4.10)			
						65.00	6.70	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(1.80)			
						63.20	8.50	Black COAL (PENNINE LOWER COAL MEASURES).		
							(0.70)			
						62.50	9.20	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(6.10)			

<b>Remarks</b> No gases detected. No evidence of worked coal seams detected.	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R04	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R04**

<b>Machine :</b> Flush : Air/mist Core Dia: mm Method : Rotary Openhole		<b>Casing Diameter</b>		<b>Ground Level (mOD)</b> 71.70		<b>Client</b> Northumbria Homes		<b>Job Number</b> 20004	
		<b>Location</b> Northumberland		<b>Dates</b> 01/04/2021		<b>Engineer</b> S Jones		<b>Sheet</b> 2/3	

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						56.40	15.30	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(1.70)			
						54.70	17.00	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(2.40)			
						52.30	19.40	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(15.60)			

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:75	
	<b>Figure No.</b> 20004.R04	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R04**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole		<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.70	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
		<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						36.70	35.00	Complete at 35.00m		

Remarks	Scale (approx)	Logged By
	1:75	
	Figure No. 20004.R04	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R05**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						69.10	2.50	Light grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
						66.20	5.40	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
						61.90	9.70	Grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
						59.00	12.60	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
						57.40	14.20	Grey MUDSTONE (PENNINE LOWER COAL MEASURES).		

<b>Remarks</b> No gases detected. No evidence of worked coal seams detected.	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R05	





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Site  
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Borehole Number  
**R05**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(1.90)			
						55.50	16.10	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(1.80)			
						53.70	17.90	Grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(1.50)			
						52.20	19.40	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(5.20)			
						47.00	24.60	Grey MUDSTONE (PENNINE LOWER COAL MEASURES).		
							(2.50)			
						44.50	27.10	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R05	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R05**

<b>Machine :</b> Flush : Air/mist Core Dia: mm Method : Rotary Openhole		<b>Casing Diameter</b>		<b>Ground Level (mOD)</b> 71.60		<b>Client</b> Northumbria Homes		<b>Job Number</b> 20004	
		<b>Location</b> Northumberland		<b>Dates</b> 01/04/2021		<b>Engineer</b> S Jones		<b>Sheet</b> 3/3	

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						36.60	(7.90) 35.00	Complete at 35.00m		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R05	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R06**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND: Grey mottled brown and black very silty fine to coarse SAND AND angular fine to coarse GRAVEL with occasional cobbles of brick sandstone, siltstone and mudstone (COLLIERY SPOIL).		
						69.30	2.30	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
						64.80	6.80	Soft brown SANDSTONE (PENNINE LOWER COAL MEASURES). Water strike at 6.8m bgl.		
						63.50	8.10	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		

<b>Remarks</b> Broken ground at 25.9m bgl (0.8m thick).	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R06	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R06**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(17.80)			
						45.70	25.90	BROKEN GROUND		
						44.90	26.70	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(3.50)			

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R06	





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Site  
Ideal Caravans, Clifton

Borehole Number  
**R06**

<b>Machine :</b> <b>Flush :</b> Air/mist <b>Core Dia:</b> mm <b>Method :</b> Rotary Openhole	<b>Casing Diameter</b>	<b>Ground Level (mOD)</b> 71.60	<b>Client</b> Northumbria Homes	<b>Job Number</b> 20004
	<b>Location</b> Northumberland	<b>Dates</b> 01/04/2021	<b>Engineer</b> S Jones	<b>Sheet</b> 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						41.40	30.20	Soft light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(4.50)			
						36.90	34.70	Light brown SANDSTONE (PENNINE LOWER COAL MEASURES).		
							(5.30)			
						31.60	40.00	Complete at 40.00m		

<b>Remarks</b>	<b>Scale (approx)</b> 1:75	<b>Logged By</b>
	<b>Figure No.</b> 20004.R06	



## Appendix C – Geotechnical Laboratory Test Results





Highways Laboratory  
Bassington Drive • Cramlington • Northumberland • NE23 8AJ  
Tel (01670) 737575 • Email highwayslaboratory@northumberland.gov.uk

### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP01 at 2.7m**

Material Type: **Light brown, grey, very sandy CLAY with very occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**

Date Received: **31/03/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>26.1</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>35</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>21</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>14</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>85</b>	
Soil Classification:	<b>CL/CI</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_

M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





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### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP03 at 3.7m**

Material Type: **Brown, sandy CLAY with occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**      Date Received: **31/03/2021**      Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>20.1</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>41</b>	Part 2 Clause 4.4 (One point method)
Plastic Limit (%):	<b>22</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>19</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>77</b>	
Soil Classification:	<b>CI</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **88.18g material retained on 20mm test sieve. This was removed prior to testing.  
Insufficient material for 4 point method.**

Certificate of sampling received:

Signed: \_\_\_\_\_



M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





Highways Laboratory  
Bassington Drive • Cramlington • Northumberland • NE23 8AJ  
Tel (01670) 737575 • Email highwayslaboratory@northumberland.gov.uk

### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP03 at 4.0m**

Material Type: **Dark grey CLAY with occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**

Date Received: **31/03/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>14.6</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>36</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>18</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>18</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>83</b>	
Soil Classification:	<b>CI</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_

M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





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### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP04 at 2.0m**

Material Type: **Brown, grey, sandy, friable CLAY with very occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**    Date Received: **31/03/2021**    Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>18.1</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>37</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>20</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>17</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>87</b>	
Soil Classification:	<b>CI</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_

M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





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### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP05 at 3.0m**

Material Type: **Brown, grey, sandy CLAY with occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**

Date Received: **31/03/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>18.8</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>37</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>19</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>18</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>79</b>	
Soil Classification:	<b>Cl</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_



M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





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### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **TP06 at 2.0m**

Material Type: **Light brown, grey, very sandy CLAY with occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **16/03/2021**

Date Received: **31/03/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>17.7</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>27</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>16</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>11</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>86</b>	
Soil Classification:	<b>CL</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_



M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **01/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





Highways Laboratory  
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Tel (01670) 737575 • Email highwayslaboratory@northumberland.gov.uk

### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **WS06 at 1.20m**

Material Type: **Brown, orange, friable, sandy CLAY with gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **29/03/2021**

Date Received: **09/04/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>14.2</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>34</b>	Part 2 Clause 4.3 (Definitive Method)
Plastic Limit (%):	<b>20</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>14</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>77</b>	
Soil Classification:	<b>CL</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **None**

Certificate of sampling received:

Signed: \_\_\_\_\_



M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **09/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**





Highways Laboratory  
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### CLASSIFICATION OF SOILS

Tests according to B.S. 1377 : 1990

Client: **Coast Consulting Engineers, 7 Silvertown Court, NE23 7RY**

Engineer: **Simon Jones**

Project: **20004/SHJ/110 - Clifton**

Location: **WS09 at 2.00m**

Material Type: **Brown, grey, sandy CLAY with occasional gravel**

Sample Specification: **Sampled by Site Staff/Client**

Source: **Site**

Date Sampled: **30/03/2021**

Date Received: **09/04/2021**

Sampled By: **Clients Staff**

	<u>Test Results</u>	<u>Specification</u>
Water Content (%):	<b>24.7</b>	BS EN ISO 17892-1;2014
The liquid and Plastic Limits are prepared in accordance with BS1377: Part 2: Clause 4.2.4 due to the nature of most materials in the surrounding area (Sandy CLAY with gravel cobbles and boulders)		
Liquid Limit (%):	<b>49</b>	Part 2 Clause 4.4 (One point method)
Plastic Limit (%):	<b>27</b>	Part 2 Clause 5.3
Plasticity Index (%):	<b>22</b>	Part 2 Clause 5.4
Passing 425mic (%):	<b>81</b>	
Soil Classification:	<b>CI</b>	

Results reported herein relate only to the material supplied or sampled by the laboratory. This report shall not be reproduced except in full without prior written consent. Sampling certificate Uncertainty available on request where applicable. All testing carried out at NCC Laboratory

Remarks: **Insufficient material for 4 point method**

Certificate of sampling received:

Signed: \_\_\_\_\_

M. Newton, Laboratory Manager

P. Fletcher, Senior Technician

Start of Test Date: **09/04/2021**

End of Test Date: **15/04/2021**

Report Date: **15/04/2021**



## Appendix D – Chemical Laboratory Test Results





## ANALYTICAL TEST REPORT

**Contract no:** 94578(1)  
**Contract name:** Clifton  
**Client reference:** 20004  
**Clients name:** Coast Consulting Engineers  
**Clients address:** 7 Silvertown Court  
Northumberland Business Park  
Cramlington  
NE23 7RY

**Samples received:** 22 March 2021  
**Analysis started:** 22 March 2021  
**Analysis completed:** 27 April 2021  
**Report issued:** 27 April 2021

This is a supplementary report to report number 94578 issued 29 March 2021.

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**



Rachael Burton  
Customer Support Squad Leader



# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
94578-1	TP01	0.70	Clayey Sand with Gravel	-	-	10.9
94578-2	TP02	0.50	Clayey Sand with Gravel	-	-	10.1
94578-3	TP03	0.80	Clayey Sand with Gravel	-	-	21.6
94578-4	TP04	0.50	Clayey Sand with Gravel	-	-	15.0
94578-5	TP05	0.50	Clayey Sand with Gravel	-	-	10.3
94578-6	TP06	0.50	Sandy Clay with Gravel	-	-	19.5
94578-7	TP07	0.50	Clayey Sand with Gravel	-	-	13.9
94578-8	TP08	0.40	Clayey Sand with Gravel	-	-	12.1
94578-9	TP02	1.50	Chalky Clay with Gravel	-	-	32.8
94578-10	TT01	2.75	Sandy Clay with Gravel	-	-	22.4
94578-11	TP05	2.30	Clayey Sand with Gravel	-	-	24.6
94578-12	TP05	2.50	Sandy Clay with Gravel	-	-	22.5
94578-13	TP07	1.50	Sandy Clay with Gravel	-	-	17.4
94578-14	TP08	3.30	Clayey Sand with Gravel	-	-	10.1



# Chemtech Environmental Limited

## SOILS

Lab number			94578-1	94578-2	94578-3	94578-4	94578-5	94578-6
Sample id			TP01	TP02	TP03	TP04	TP05	TP06
Depth (m)			0.70	0.50	0.80	0.50	0.50	0.50
Date sampled			16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
Test	Method	Units						
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	1.3	1.9	2.1	4.5	2.6	5.0
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	<0.2	<0.2	<0.2	0.3	<0.2	0.3
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	71	46	41	53	61	70
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	41	51	46	53	38	48
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	28	24	46	65	42	76
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	38	31	19	29	24	33
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	1.5	1.4	3.9	2.1	1.4	2.1
Zinc (total)	CE127 <sup>M</sup>	mg/kg Zn	64	39	34	122	70	151
pH	CE004 <sup>M</sup>	units	6.6	7.5	3.7	7.6	7.4	6.1
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	102	66	248	78	45	140
Sulphate (total)	CE062	mg/kg SO <sub>4</sub>	1053	646	25377	2383	835	1112
Sulphur (total)	CE119	mg/kg S	329	454	6934	1644	713	1614
Total Organic Carbon (TOC)	CE197	% w/w C	5.8	6.8	18.3	8.4	7.8	18.1
Calorific value	CE069	kJ/kg	1856	2170	5840	2678	2509	5789
<b>PAH</b>								
Naphthalene	CE087 <sup>M</sup>	mg/kg	0.03	0.06	0.14	0.09	0.06	0.05
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	<0.02	0.04	0.03	0.24	0.09	<0.02
Acenaphthene	CE087 <sup>M</sup>	mg/kg	<0.02	0.09	0.04	0.33	0.09	0.03
Fluorene	CE087 <sup>U</sup>	mg/kg	0.03	0.10	0.08	0.35	0.19	0.05
Phenanthrene	CE087 <sup>M</sup>	mg/kg	0.55	1.12	0.98	4.40	2.51	0.60
Anthracene	CE087 <sup>U</sup>	mg/kg	0.06	0.37	0.25	1.49	1.32	0.10
Fluoranthene	CE087 <sup>M</sup>	mg/kg	0.45	2.44	1.77	14.31	12.81	0.48
Pyrene	CE087 <sup>M</sup>	mg/kg	0.30	1.99	1.44	11.51	10.45	0.36
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	0.20	1.44	1.19	7.58	8.02	0.22
Chrysene	CE087 <sup>M</sup>	mg/kg	0.23	1.56	1.23	7.43	7.25	0.28
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.20	2.23	1.54	9.48	8.96	0.28
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.09	0.85	0.62	3.75	3.65	0.09
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	0.15	1.86	1.17	8.09	7.96	0.19
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	0.07	1.54	1.05	7.63	6.18	0.13
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	<0.02	0.37	0.24	1.56	1.51	<0.02
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	0.06	1.37	0.86	6.19	5.07	0.10
PAH (total of USEPA 16)	CE087	mg/kg	2.41	17.4	12.6	84.4	76.1	2.96
<b>TPH</b>								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	-	-	-



# Chemtech Environmental Limited

## SOILS

Lab number			94578-1	94578-2	94578-3	94578-4	94578-5	94578-6
Sample id			TP01	TP02	TP03	TP04	TP05	TP06
Depth (m)			0.70	0.50	0.80	0.50	0.50	0.50
Date sampled			16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
Test	Method	Units						
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	-	-	-
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD



# Chemtech Environmental Limited

## SOILS

Lab number			94578-7	94578-8	94578-9	94578-10	94578-11	94578-12
Sample id			TP07	TP08	TP02	TT01	TP05	TP05
Depth (m)			0.50	0.40	1.50	2.75	2.30	2.50
Date sampled			16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
Test	Method	Units						
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	2.4	16	3.2	-	-	-
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	<0.2	0.7	<0.2	-	-	-
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	78	77	25	-	-	-
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	-	-	-
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	33	48	10	-	-	-
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	36	110	20	-	-	-
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	<0.5	<0.5	<0.5	-	-	-
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	33	52	7.8	-	-	-
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	1.6	1.9	1.0	-	-	-
Zinc (total)	CE127 <sup>M</sup>	mg/kg Zn	111	244	31	-	-	-
pH	CE004 <sup>M</sup>	units	6.1	6.5	12.5	-	-	7.1
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	808	1721	53	-	-	64
Sulphate (total)	CE062	mg/kg SO <sub>4</sub>	2573	21327	12990	-	-	-
Sulphur (total)	CE119	mg/kg S	1039	6527	-	-	-	-
Total Organic Carbon (TOC)	CE197	% w/w C	12.2	3.0	0.6	-	-	-
Calorific value	CE069	kJ/kg	3914	973	-	-	19584	-
<b>PAH</b>								
Naphthalene	CE087 <sup>M</sup>	mg/kg	0.06	0.02	<0.02	-	-	-
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02	-	-	-
Acenaphthene	CE087 <sup>M</sup>	mg/kg	0.04	0.05	<0.02	-	-	-
Fluorene	CE087 <sup>U</sup>	mg/kg	0.06	0.13	<0.02	-	-	-
Phenanthrene	CE087 <sup>M</sup>	mg/kg	1.04	1.14	0.22	-	-	-
Anthracene	CE087 <sup>U</sup>	mg/kg	0.19	0.30	0.02	-	-	-
Fluoranthene	CE087 <sup>M</sup>	mg/kg	0.92	2.22	0.05	-	-	-
Pyrene	CE087 <sup>M</sup>	mg/kg	0.64	1.62	0.03	-	-	-
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	0.36	1.07	<0.02	-	-	-
Chrysene	CE087 <sup>M</sup>	mg/kg	0.41	1.13	<0.03	-	-	-
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.34	1.32	<0.02	-	-	-
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.11	0.54	<0.03	-	-	-
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	0.24	1.04	<0.02	-	-	-
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	0.16	0.93	<0.02	-	-	-
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	<0.02	0.19	<0.02	-	-	-
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	0.13	0.75	<0.02	-	-	-
PAH (total of USEPA 16)	CE087	mg/kg	4.69	12.5	<0.34	-	-	-
<b>TPH</b>								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	<0.01	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	<0.01	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	0.02	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	<1	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	<1	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	2	-	-



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## SOILS

Lab number			94578-7	94578-8	94578-9	94578-10	94578-11	94578-12
Sample id			TP07	TP08	TP02	TT01	TP05	TP05
Depth (m)			0.50	0.40	1.50	2.75	2.30	2.50
Date sampled			16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
Test	Method	Units						
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	<1	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	<1	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	<0.1	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	<0.1	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	1.4	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	305	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	1110	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	1248	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	14	-	-
<b>Subcontracted analysis</b>								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	-	-	-

# Chemtech Environmental Limited

## SOILS

Lab number			94578-13	94578-14
Sample id			TP07	TP08
Depth (m)			1.50	3.30
Date sampled			16/03/2021	16/03/2021
Test	Method	Units		
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	-	-
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	-	-
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	-	-
Chromium (VI)	CE146	mg/kg CrVI	-	-
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	-	-
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	-	-
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	-	-
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	-	-
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	-	-
Zinc (total)	CE127 <sup>M</sup>	mg/kg Zn	-	-
pH	CE004 <sup>M</sup>	units	7.4	7.0
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	52	47
Sulphate (total)	CE062	mg/kg SO <sub>4</sub>	-	-
Sulphur (total)	CE119	mg/kg S	-	-
Total Organic Carbon (TOC)	CE197	% w/w C	-	-
Calorific value	CE069	kJ/kg	-	-
<b>PAH</b>				
Naphthalene	CE087 <sup>M</sup>	mg/kg	-	-
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	-	-
Acenaphthene	CE087 <sup>M</sup>	mg/kg	-	-
Fluorene	CE087 <sup>U</sup>	mg/kg	-	-
Phenanthrene	CE087 <sup>M</sup>	mg/kg	-	-
Anthracene	CE087 <sup>U</sup>	mg/kg	-	-
Fluoranthene	CE087 <sup>M</sup>	mg/kg	-	-
Pyrene	CE087 <sup>M</sup>	mg/kg	-	-
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	-	-
Chrysene	CE087 <sup>M</sup>	mg/kg	-	-
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	-	-
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	-	-
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	-	-
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	-	-
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	-	-
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	-	-
PAH (total of USEPA 16)	CE087	mg/kg	-	-
<b>TPH</b>				
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-



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## SOILS

Lab number			94578-13	94578-14
Sample id			TP07	TP08
Depth (m)			1.50	3.30
Date sampled			16/03/2021	16/03/2021
Test	Method	Units		
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-
<b>Subcontracted analysis</b>				
Asbestos (qualitative)	\$	-	-	-

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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO <sub>4</sub>
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry		100	mg/kg SO <sub>4</sub>
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		100	mg/kg S
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE069	Calorific value	Combustion, Carbon analyser	Dry		100	kJ/kg
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg



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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
94578-1	TP01	0.70	N	
94578-2	TP02	0.50	N	
94578-3	TP03	0.80	N	
94578-4	TP04	0.50	N	
94578-5	TP05	0.50	N	
94578-6	TP06	0.50	N	
94578-7	TP07	0.50	N	
94578-8	TP08	0.40	N	
94578-9	TP02	1.50	N	
94578-10	TT01	2.75	N	
94578-11	TP05	2.30	N	
94578-12	TP05	2.50	N	
94578-13	TP07	1.50	N	
94578-14	TP08	3.30	N	



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## TEST REPORT REVISIONS

The table below identifies amendments that have been made to this test report for each revision.

Test Report Reference	Details of amendments to test report	Issue Date
94578	Original report issued	29 March 2021
94578(1)	Calorific value and total sulphur added to samples 1-8.	27 April 2021



## ANALYTICAL TEST REPORT

**Contract no:** 94885(1)  
**Contract name:** Clifton  
**Client reference:** 20004  
**Clients name:** Coast Consulting Engineers  
**Clients address:** 7 Silvertown Court  
Northumberland Business Park  
Cramlington  
NE23 7RY

**Samples received:** 30 March 2021

**Analysis started:** 30 March 2021

**Analysis completed:** 19 April 2021

**Report issued:** 19 April 2021

This is a supplementary report to report number 94885 issued 08 April 2021.

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**



Rachael Burton  
Customer Support Squad Leader



# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
94885-1	WS03	0.55	Sandy Clay with Gravel	-	-	14.4
94885-2	WS4	0.90	Sand with Gravel	-	-	9.0
94885-3	WS06	1.40	Sandy Clay with Gravel	-	-	12.9
94885-4	WS07	0.75	Sandy Clay with Gravel	-	-	14.9
94885-5	WS07	2.40	Clayey Sand	-	-	13.9
94885-6	WS09	1.00	Sand with Gravel	-	-	5.6
94885-7	WS10	2.00	Clayey Sand	-	-	17.4

# Chemtech Environmental Limited

## SOILS

Lab number			94885-1	94885-2	94885-3	94885-4	94885-5	94885-6
Sample id			WS03	WS4	WS06	WS07	WS07	WS09
Depth (m)			0.55	0.90	1.40	0.75	2.40	1.00
Date sampled			29/03/2021	29/03/2021	29/03/2021	30/03/2021	30/03/2021	30/03/2021
Test	Method	Units						
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	2.3	1.3	-	8.6	-	-
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	<0.2	<0.2	-	0.4	-	-
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	53	16	-	64	-	-
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	-	<1	-	-
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	29	32	-	44	-	-
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	37	167	-	71	-	-
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	<0.5	<0.5	-	<0.5	-	-
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	15	17	-	36	-	-
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	0.6	0.5	-	0.6	-	-
Zinc (total)	CE127 <sup>M</sup>	mg/kg Zn	34	26	-	119	-	-
pH	CE004 <sup>M</sup>	units	7.2	5.1	6.9	7.2	6.9	7.5
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	278	68	174	1505	316	135
Sulphate (total)	CE062	mg/kg SO <sub>4</sub>	1205	5166	-	6096	-	-
Sulphur (total)	CE119	mg/kg S	5551	3820	-	2708	-	-
Total Organic Carbon (TOC)	CE197	% w/w C	20.1	69.7	-	6.6	-	-
Calorific value	CE069	kJ/kg	6435	22294	-	2112	-	-
<b>PAH</b>								
Naphthalene	CE087 <sup>M</sup>	mg/kg	0.03	0.15	-	0.04	-	-
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	-	<0.02	-	-
Acenaphthene	CE087 <sup>M</sup>	mg/kg	0.03	0.02	-	0.54	-	-
Fluorene	CE087 <sup>U</sup>	mg/kg	0.03	0.10	-	0.54	-	-
Phenanthrene	CE087 <sup>M</sup>	mg/kg	0.77	3.19	-	0.65	-	-
Anthracene	CE087 <sup>U</sup>	mg/kg	0.09	0.17	-	0.10	-	-
Fluoranthene	CE087 <sup>M</sup>	mg/kg	0.45	0.98	-	0.92	-	-
Pyrene	CE087 <sup>M</sup>	mg/kg	0.32	0.52	-	0.65	-	-
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	0.16	0.28	-	0.32	-	-
Chrysene	CE087 <sup>M</sup>	mg/kg	0.18	0.42	-	0.34	-	-
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.13	0.27	-	0.44	-	-
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.05	0.07	-	0.17	-	-
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	0.09	0.11	-	0.29	-	-
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	0.05	0.08	-	0.22	-	-
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	-	0.06	-	-
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	0.06	0.10	-	0.22	-	-
PAH (total of USEPA 16)	CE087	mg/kg	2.44	6.44	-	5.50	-	-
<b>TPH</b>								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	<0.01	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	<0.01	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	<0.01	-	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	<1	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	<1	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	4	-	-



# Chemtech Environmental Limited

## SOILS

Lab number			94885-1	94885-2	94885-3	94885-4	94885-5	94885-6
Sample id			WS03	WS4	WS06	WS07	WS07	WS09
Depth (m)			0.55	0.90	1.40	0.75	2.40	1.00
Date sampled			29/03/2021	29/03/2021	29/03/2021	30/03/2021	30/03/2021	30/03/2021
Test	Method	Units						
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	3	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	<1	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	<0.1	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	<0.1	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	<0.1	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	<4	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	18	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	108	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	13	-	-
<b>Subcontracted analysis</b>								
Asbestos (qualitative)	\$	-	NAD	NAD	-	NAD	-	-

# Chemtech Environmental Limited

## SOILS

<b>Lab number</b>			94885-7
<b>Sample id</b>			WS10
<b>Depth (m)</b>			2.00
<b>Date sampled</b>			30/03/2021
<b>Test</b>	<b>Method</b>	<b>Units</b>	
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	-
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	-
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	-
Chromium (VI)	CE146	mg/kg CrVI	-
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	-
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	-
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	-
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	-
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	-
Zinc (total)	CE127 <sup>M</sup>	mg/kg Zn	-
pH	CE004 <sup>M</sup>	units	7.8
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	52
Sulphate (total)	CE062	mg/kg SO <sub>4</sub>	-
Sulphur (total)	CE119	mg/kg S	-
Total Organic Carbon (TOC)	CE197	% w/w C	-
Calorific value	CE069	kJ/kg	-
<b>PAH</b>			
Naphthalene	CE087 <sup>M</sup>	mg/kg	-
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	-
Acenaphthene	CE087 <sup>M</sup>	mg/kg	-
Fluorene	CE087 <sup>U</sup>	mg/kg	-
Phenanthrene	CE087 <sup>M</sup>	mg/kg	-
Anthracene	CE087 <sup>U</sup>	mg/kg	-
Fluoranthene	CE087 <sup>M</sup>	mg/kg	-
Pyrene	CE087 <sup>M</sup>	mg/kg	-
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	-
Chrysene	CE087 <sup>M</sup>	mg/kg	-
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	-
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	-
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	-
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	-
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	-
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	-
PAH (total of USEPA 16)	CE087	mg/kg	-
<b>TPH</b>			
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-



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## SOILS

<b>Lab number</b>	94885-7		
<b>Sample id</b>	WS10		
<b>Depth (m)</b>	2.00		
<b>Date sampled</b>	30/03/2021		
<b>Test</b>	<b>Method</b>	<b>Units</b>	
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-
<b>Subcontracted analysis</b>			
Asbestos (qualitative)	\$	-	-

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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO <sub>4</sub>
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry		100	mg/kg SO <sub>4</sub>
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		100	mg/kg S
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE069	Calorific value	Combustion, Carbon analyser	Dry		100	kJ/kg
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg



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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

# Chemtech Environmental Limited

## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
94885-1	WS03	0.55	N	
94885-2	WS4	0.90	N	
94885-3	WS06	1.40	N	
94885-4	WS07	0.75	N	
94885-5	WS07	2.40	N	
94885-6	WS09	1.00	N	
94885-7	WS10	2.00	N	



# Chemtech Environmental Limited

## TEST REPORT REVISIONS

The table below identifies amendments that have been made to this test report for each revision.

Test Report Reference	Details of amendments to test report	Issue Date
94885	Original report issued	08 April 2021
94885(1)	Total sulphur and calorific value testing on samples 1,2 and 4.	19 April 2021



## ANALYTICAL TEST REPORT

**Contract no:** 95004  
**Contract name:** Coast Engineering, Clifton  
**Client reference:** S0948  
**Clients name:** Northumberland County Council  
**Clients address:** Highways Laboratory  
Bassington Drive  
Cramlington  
NE23 8AJ

**Samples received:** 06 July 2021  
**Analysis started:** 06 April 2021  
**Analysis completed:** 12 April 2021  
**Report issued:** 12 April 2021

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope.  
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.  
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.  
Methods, procedures and performance data are available on request.  
Results reported herein relate only to the material supplied to the laboratory.  
This report shall not be reproduced except in full, without prior written approval.  
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing

**Approved by:**   
Rachael Burton  
Customer Support Squad Leader



# Chemtech Environmental Limited

## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
95004-1	S0948/01	2.70	Clay with Gravel	-	-	22.3
95004-2	S0948/02	3.70	Clay with Gravel	-	-	17.4
95004-3	S0948/03	4.00	Clay with Gravel	-	-	11.5
95004-4	S0948/05	3.00	Clay with Gravel	-	-	15.8
95004-5	S0948/06	2.00	Sandy Clay with Gravel	-	-	13.8

# Chemtech Environmental Limited

## SOILS

Lab number			95004-1	95004-2	95004-3	95004-4	95004-5
Sample id			S0948/01	S0948/02	S0948/03	S0948/05	S0948/06
Depth (m)			2.70	3.70	4.00	3.00	2.00
Date sampled			16/03/2021	16/03/2021	16/03/2021	16/03/2021	16/03/2021
Test	Method	Units					
pH	CE004 <sup>M</sup>	units	4.3	7.3	7.4	7.6	7.6
Sulphate (2:1 water soluble)	CE061	mg/l SO <sub>4</sub>	347	289	322	70	29



# Chemtech Environmental Limited

## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO <sub>4</sub>

# Chemtech Environmental Limited

## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

N	No (not deviating sample)
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NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
95004-1	S0948/01	2.70	N	
95004-2	S0948/02	3.70	N	
95004-3	S0948/03	4.00	N	
95004-4	S0948/05	3.00	N	
95004-5	S0948/06	2.00	N	



## Appendix E – Gas and Groundwater Monitoring Results





## Appendix F – Human Health Risk Assessment Summary

Parameter	No. of samples tested	Range of results (mg/kg)	GAC (6.0% SOM)	No. of samples exceeding GAC
<b>Metals, Metalloids, Non-metals</b>				
Arsenic	12	1.30 - 16.00	37	0
Cadmium	12	0.20 - 0.70	11	0
Chromium III	12	16 - 78	910	0
Chromium VI	12	<1.00	6	0
Copper	12	10 - 53	2400	0
Lead	12	20 - 167	200	0
Mercury, Inorganic	12	<0.50	40	0
Nickel	12	7.80 - 52	130	0
Selenium	12	<0.50 - 3.90	250	0
Zinc	12	26 - 244	3700	0
<b>Inorganics</b>				
pH	12	3.7 - 12.5		
Calorific Value (MJ/kg)	12	0.97 – 22.3	2.0	<b>9</b>
Total Organic Carbon	12	0.61 - 69.70		
Sulphate Aqueous Extract as SO4	12	45 – 1,721		
Total Sulphate as SO4	12	646 – 25,377		
<b>Petroleum Hydrocarbons</b>				
Aliphatic C5-C6	2	0.10 - 0.10	160	0
Aliphatic C6-C8	2	0.10 - 0.10	530	0
Aliphatic C8-C10	2	0.10 - 1.40	150	0
Aliphatic C10-C12	2	4 - 305	760	0
Aliphatic C12-C16	2	18 – 1,110	4300	0
Aliphatic C16-C21	2	108 – 1,248	110,000	0
Aliphatic C21-C35	2	108 – 1,248	110,000	0
Aliphatic C5-C35	0			
Aromatic C5-C7	2	<0.01	300	0
Aromatic C7-C8	2	<0.01	660	0
Aromatic C8-C10	2	<0.01 - 0.02	190	0
Aromatic C10-C12	2	1.0 - 1.0	380	0
Aromatic C12-C16	2	1.0 - 1.0	660	0
Aromatic C16-C21	2	2.0 - 4.0	930	0
Aromatic C21-C35	2	2.0 - 4.0	1,700	0
<b>Polycyclic Aromatic Hydrocarbons</b>				
Naphthalene	12	<0.02 - 0.15	13	0
Acenaphthylene	12	<0.02 - 0.24	920	0
Acenaphthene	12	<0.02 - 0.54	1,100	0
Fluorene	12	<0.02 - 0.54	860	0
Phenanthrene	12	0.22 - 4.40	440	0



Parameter	No. of samples tested	Range of results (mg/kg)	GAC (6.0% SOM)	No. of samples exceeding GAC
Anthracene	12	<0.02 - 1.49	11000	0
Fluoranthene	12	0.05 - 14.31	890	0
Pyrene	12	0.03 - 11.51	2000	0
Benzo(a)anthracene	12	<0.02 - 8.02	13	0
Chrysene	12	<0.03 - 7.43	27	0
Benzo(b)fluoranthene	12	<0.02 - 9.48	3.70	2
Benzo(k)fluoranthene	12	<0.03 - 3.75	100	0
Benzo(a)pyrene	12	<0.02 - 8.09	3.00	2
Indeno(1,2,3-c,d)pyrene	12	<0.02 - 7.63	41	0
Dibenzo(a,h)anthracene	12	<0.02 - 1.56	0.30	3
Benzo(g,h,i)perylene	12	<0.02 - 6.19	350	0
PAH Total	0			
<b>Others</b>				
Asbestos	12	NAD	Present	0

NAD No Asbestos Detected



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